

Child obesity determinants, prevalence and management: as an emerging pandemic in the city of Gaborone, Botswana

Mbvundula Gerson

Public Health Lecturer

Public Health Department, Gaborone University College, Gaborone, Botswana

Email - gersonmbvu@yahoo.co.uk

Abstract: World Health Organization estimated “overweight and obesity to cause 3, 4 million deaths, 3.9% of quality years lost and 3.8% of disability-adjusted life years (DALYs) worldwide”. (WHO 2015) These alarming figures are a growing concern of adult Obesity emanating from effects of the child Obesity, which has reached pandemic status globally in the developed world and gradually creeping in regionally and nationally at an alarming rate, becoming a major public health issue. The past three years has shown the greatest increase of recorded child obesity cases across Africa and Botswana being in the top three. This alarming increase is worrisome looking at the fact that obese children eventually lead to obese Adults while it is completely avoidable and preventable. This paper investigates Child Obesity Determinants, prevalence and management as an emerging Pandemic in the City of Gaborone. The literature of this study was reviewed to determine the extent of child obesity in Botswana and current implemented health interventions to curb the problem. A descriptive cross sectional study design was initiated to describe current obesity trends, buying behaviours, child obesity perceptions, and to analyse current implemented measures to curb child obesity. The major concerns of child obesity lies in mental disorders such as anxiety, depression and Low self-esteem, affects quality of life and attributed to social problems such as bullying and stigma with high incidences of cardiovascular diseases, mental clinical depression, physical injuries and deterioration in educational performance. Ethical issues were highly considered as obesity is a sensitive issue and a signed consent was sought from all participating parents before commencing the research. The research unearthed that most Gaborone residents have little understanding of Child Obesity causes and its management, most people embrace child overweight to be normal and its culturally accepted as its termed the child is “fresh”. Parents need to be taught on the importance of what the child eats, how often they eat and what they are eating. Television should not dictate what children eat and government has to implement policies that regulate sugar and fat content of fast food restaurants while the greatest responsibility lies on the parents monitoring Television and Computer time as it leads to over eating and encourage Children to play outdoors and have outings away from the Television and gadgets. Only then the future of our children will be safe guarded and adult obesity with its risks will be avoided.

Key words: Child Obesity, determinants, Prevalence, Management, emerging pandemic.

1. INTRODUCTION:

Child obesity prevalence has been on the rise in the past 5 years in the city of Gaborone Botswana and international as indicated in figure 1.

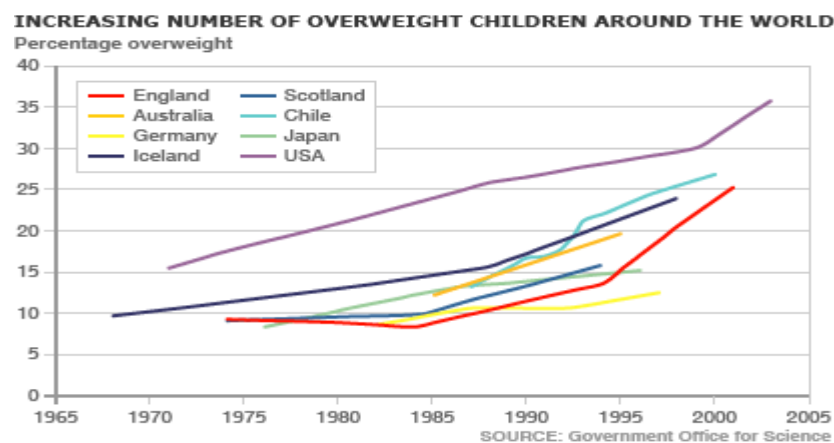


Figure 1. Growing trends of Child obesity around the world (NEWS, 2008)

Source: Government Office Science United Kingdom,

The rise in figures has increased children's risks of compromised physical and mental wellbeing which has led to a drop in academic performance for most learners under the age of 5 and increased number of outpatient visits in hospitals. Child Obesity has always been a challenge in the developed continents but has never gathered the same recognition and attention in developing countries but due to these escalating figures, it's high time we focus on this phenomenon before it gets out of hand. In a research carried out in 2013 on stunted growth in Botswana, which also documented obesity figures as it was attributed as a contributing factor to stunted growth Under Nutrition. The research stated that 50% of adults and 12% of children were obese in Botswana translating to 26 000 of general children's population. (Nutralite, 2013)

City of Gaborone has been home to many international food outlets like KFC, Chicken licken, Bimbos, Barceló's, Chisa Nyama, Debonairs Pizza, Nandos just to mention a few, some having 4 branches strategically located within the city. Majority of Batswana prefer to eat out due to life style circumstances such as high cost of living, that have led both parents to seek employment to meet daily needs, and contributed to compromised health standards and eating habits for their children, as favourite snacks now range from a packet of chips, ice cream, fizzy drinks, fresh chips that are usually high in fats and sugar opposed to fruits, juices and vegetable sandwiches. Technological advancements have also disadvantaged our children in that they are no longer active; TV and computer games now keep them occupied. Figure 1.2 shows the probability of premature deaths caused by non-communicable diseases by percentage across the globe. This is relevant information in that obese children become obese adults over time. When adequate measures are not put into place the numbers of deaths will increase over time in the next years.

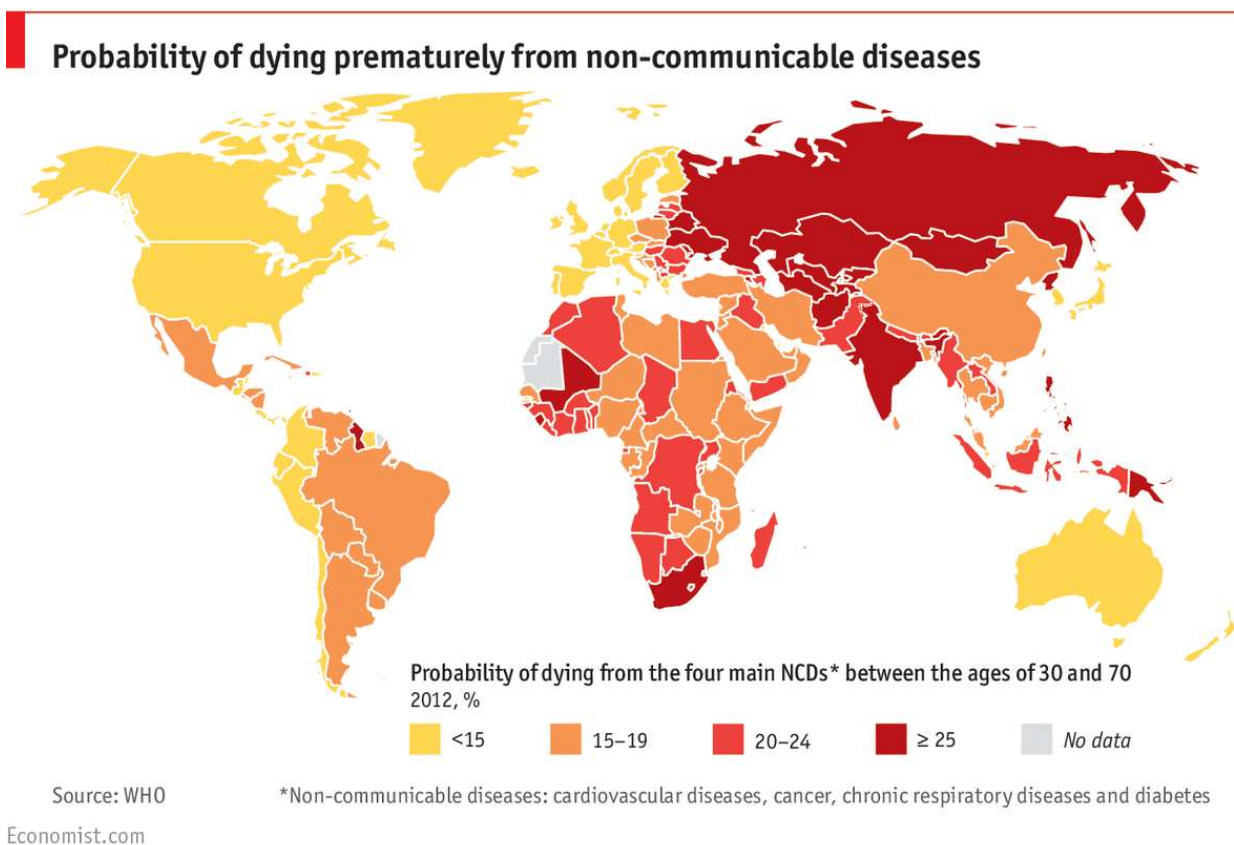


Figure 2. Probability of dying prematurely from NCDs (Roulette, 2015)

2. LITERATURE REVIEW:

2.1 Theoretical Framework

Behaviour change strategies should be adopted to improve child obesity and interventions developed to improve the health of citizens and improve the quality of life. The main strategy being in preventing and rehabilitation for those already affected.

The main contributors of child obesity has predominantly been insufficient physical exercise, fatty food content, high sugar content leading to body fat build up. Policy regulation, legislation, social norms and cultural believes are also significant in improving health at national level.

“A broader understanding of socio-environmental theories can increase understanding of social and environmental trends that maximize opportunities for weight gain and minimize healthy lifestyle options, creating ‘obesogenic’ macro- and micro-environments”.

“This shifts our understanding of the obesity epidemic from a focus on the influence of individual health behaviours and genetic profile to a recognition that there are broader influences on health status, including sociocultural influences on health behaviours that are now being reflected in population increases in weight”.

2.1.1: Global Impact.

Children have always been recognised as the future leaders of the world and with current obesity trends the future of the world is greatly threatened and soon will be doomed if measures are not put into place while we still can to reduce obesity trends and high prevalence’s. Research has proved that obesity rates have been on the rise in the past years in Botswana and the world over. History has proved that obese children continue to obese adults and the effects are irreversible at a later age (Anrig, 2003)

Overweight and obesity have high economic costs considering regular outpatient visits and low quality of life. A 1998 research estimated “related medical costs for overweight and obesity to 9.1 percent of total U.S. medical expenditures, or roughly \$78.5 billion”, Meaning obesity does not only affect the quality of life for the individual but also has an impact on the economy in relation to demands for care as opposed to healthier counterparts. Majority of literature suggest culprits of child obesity range from social, economic and environmental factors. Other sectors of the issue have never reached much recognition as family perceptions, buying habits, cultural food beliefs including parent’s involvement influencing obesity (Finkelstein, 2003).

“In children today, obesity is the most common metabolic and nutritional disease, whereas thirty years ago, obesity was rarely seen in children. In the past twenty years, there has been an exponential increase in the incidence of obesity among children”. A study done by Tremblay et al. (2000) indicated a 17% increase in obese boys and 15% increase among girls since 1981 to 1996. “Child obesity rates been escalating over the years in majority of the westernized countries and specifically in Canada. Rates were similar in most countries like Scotland, Spain and England early 1980s and by 1990 Canadian rates rose by leaps and bounds. Canadian Press”, (2003).

2.2 Obesity Causes.

Pediatrician Dr. Peter Nieman, (2004) identified insufficient exercise, genetics and over eating as the main causes of childhood obesity. He concluded that obesity is usually a combination of these three factors and never attributed to a single factor.

i): Genetics contribute to obesity rarely. Hormonal cause attribute to one percent of obesity causes (Dc, 2004)“that is usually through mutations that lead to altered secretion of hormones or hormonal action. Through guidance from parents and guardians, these children can work hard to maintain a healthy weight”.

ii): Overeating is one major contributing cause of obesity. Fast food burgers been increasing in size over the years leading to supersized kids with supersized problems. (Kempster, 2004)

Cafeterias, food outlets and fast food restaurants serve food stuff with low nutritional value and high fat content, with vending machines strategically placed in all shopping malls serving soda and candy. (Kempster, 2004)

A recent study in the Journal of Pediatrics showed that majority of children do not take vegetables in their diet due to fast food establishments around the society (King et al1999)the study was done from 1990 to 1998 showed great decline in the consumption of vegetable and fruits amongst grade six pupils. 30% of kids approximately 200 more calories in each meal through fast foods they consume, adding to 6 pounds of fat yearly. It’s upon government to establish policies that protect children from such damaging eating habits they affect longevity. Food choices and food preferences should be safe guarded. (Kuntzman, 2004)

‘One contributing factor is lack of activity due to inability to enforce physical education in schools and home. More specifically development of grass roots sports. Grass roots sports has declined over the years hence reduced amount of play time during and after school that was devoted to physical activity’. (Anrig, 2003).

“Inactivity, video game playing and extensive hours of television watching increases the risk of being overweight by 17% to 44% and becoming obese by 10% to 61%. Physical activity such as bike riding, skating, and jumping rope have been replaced by television and computer games in the 21st century”. (Anrig, 2003); (Kempster, 2004).

Children’s TV shows are coupled with fast foods adverts including presweetened cereals and studies have shown that the average child while indoors spends 25 hours weekly watching television and these hours are even higher in Africa more especially Botswana in that Television times are not monitored, parents use television as a way of reliving themselves from monitoring children. (Media Awareness Network, 2004). Healthy food commercials make up only 4% of the daily advertising food campaigns, majority are fast foods. (Oxford Count Board of Health, 2003).

Child Obesity cut across demographic settings it's more related to income and family background. A study done by Willms concluded weight gain to be associated with parent's weights. When parents are overweight, the children are at high risk of becoming obese also in that what the parents eat is what the children will eat too. (Willms, 2003).

A 1998 study done by the Medical Journal in England showed that children between the age of 1 and 3 have no risk of obesity when parents are slightly overweight or normal. However children of the same age are endanger once the parents and siblings are overweight, they are at risk of becoming obesity through association as they have no control over what they eat or do (Dc, 2004).

2.3 Obesity Consequences

Diabetes, blood pressure, depression, increased levels of low self-esteem are associated with obesity including stroke, heart diseases and asthma for the younger generation. (Dc, 2004) "Low self-esteem and depression do not seem to be a direct effect of obesity, but Dr. Neiman (2004) points out that obese children might have many social and physiological problems. Obese children and teenagers have a greater chance of being teased about their weight leading to low self-esteem and depression and the greatest risk being the teenager becoming an overweight adults and the effects turn to be difficult to deal with at this stage" (Anrig, 2003).

It has been shown that more than 60% of overweight kids have at least one additional risk factor for heart disease and that more than 85% of kids are diagnosed with type II diabetes are obese or overweight (Partridge, 2003). At one point in time, type II diabetes and heart disease were thought to only affect adults. Heart disease and associated risk factors are not only common in adults, but also in teenagers and children. Which is very frightening in that the next generation of adults will have health problems that eminent from their childhood. (Canadian Press, 2003).

Botswana has been labeled as a developing country and yet obesity is on the rise as Africa has the fastest growing obesity rates among preschool going learners as indicated in the chat above. Pienaar in her research carried out in 2015 estimated that thirty million plus obese children live in third world countries, comparable to ten million that live in westernized world. (Pienaar, 2015)

A number of health initiatives and programs are available while a lot can still be done, that would require joined up action from government, private sector and non-governmental organizations, and to effectively change obesity related lifestyles and behaviour choices. These strategies have to involve parents and guardians as they also contribute to the rising cases of obesity within the society (Atinson, 2012).

A survey from UK healthcare professionals suggested that children that gained weight faster than normal in the first six months were at greater risk of becoming over weight later in life. (Sarah A Redsell, 2010). This theory was supported by an earlier research that concluded parents were an aware of what a healthy weight was in their children which meant when parents were an aware that their children had weight problems, and thus did nothing to control the condition. Educating parents of healthy diets, food preferences, eating habits could avoid ignorance that leads to child obesity in many cases. (Sarah A Redsell, 2010)

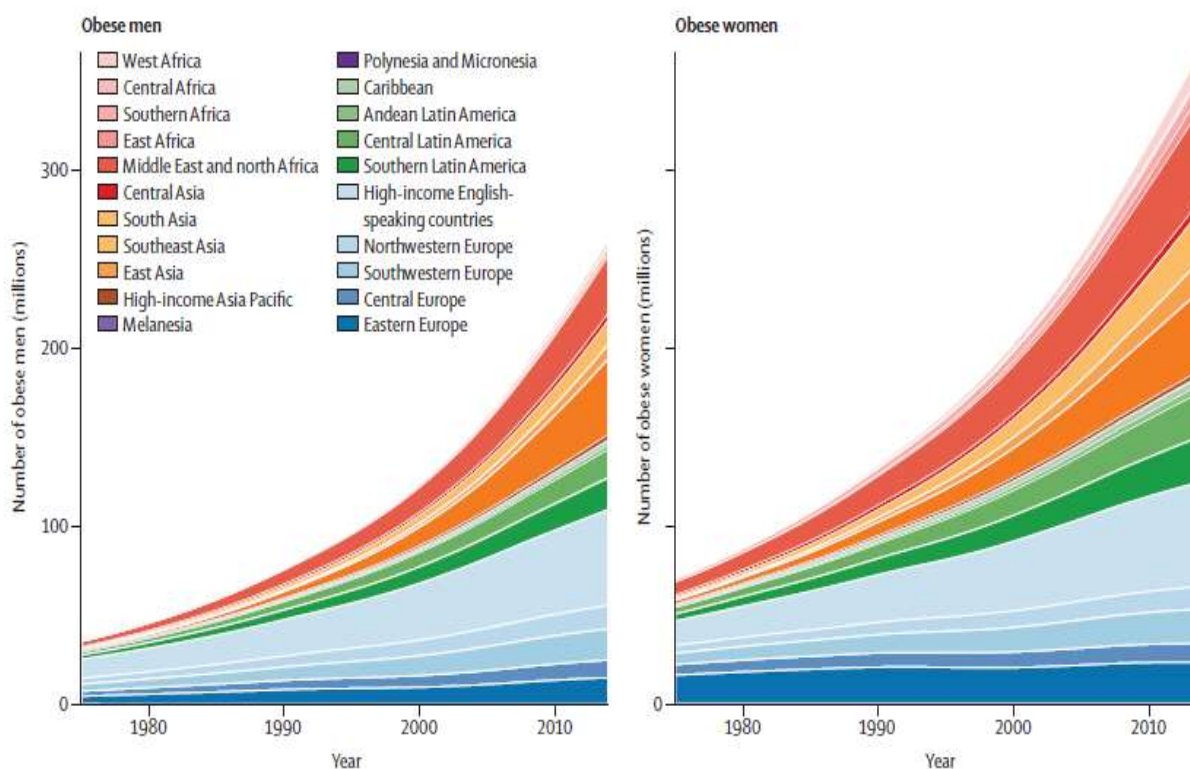


Figure 3. Obesity by gender (Rible, 2014)

Obesity usually affects woman across nations as opposed to fathers and the fact the mothers remain with the children greater part of the day, it becomes very easy for the children to also become obese due to association with the mother. The mother provides for the children and whatever she eats the child eats too. If she eats unhealthy the child will also eat unhealthy, thus it's essential to ensure that parents and guardians have adequate knowledge about food and diet to avoid such incidences.

2.4 Obesity Prevention and interventions

Obesity can be prevented and mitigated before conception, which can be done through education of parents to adopt healthy eating habits and thus avoiding high birth-rate risks. Teaching, guiding and monitoring the child's development through routine checks will avoid child overweight and obesity and improve the quality of life of the future child. Some measures that can be initiated include reducing sugar content such as sweetened drinks, French fries and candy content and restrict food intake thus reducing quantity. (Medbroadcast, 2003).

These are some of the literature I have reviewed with the aim of identifying areas that appeal to my research area and society and analyzed areas that were not researched by these scholars that would give more room for research.

3. DISCUSSION:

3.1 Causes of Child Obesity

Child obesity is prevalent in today's age and can be linked to numerous reasons from maternal employment to heredity, life style, inactivity, sedentary life style and food. The study unearthed the following discussed issues as outlined in the following headings.

3.2 Lack of Physical Activity

Children rarely have time to play outside, they rather play inside with computer, phone or television games. This inability to play has contributed to obesity as children play. On average a child at play loses 23 calories in 30 minutes of being active.

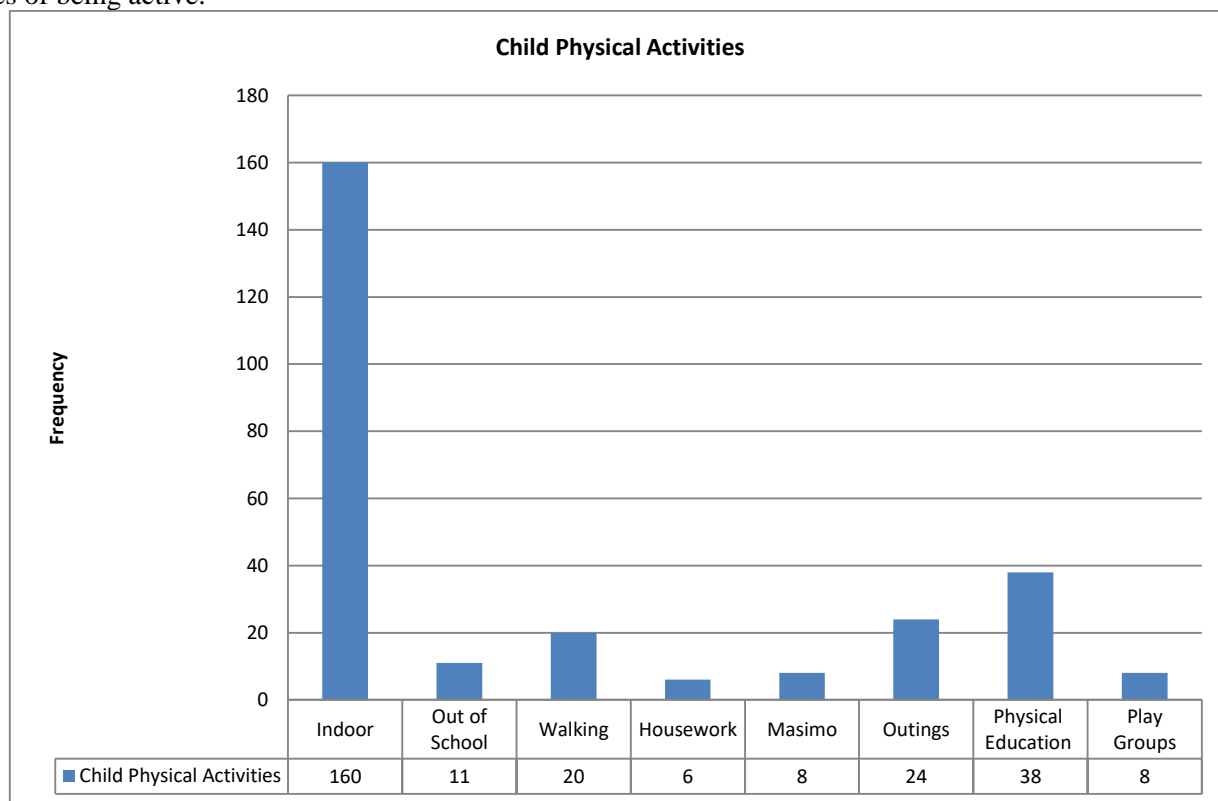


Figure 4. Child Physical Activities

From the collected data 160 parents indicated their children play indoors as compared to other means of being active. 11 parents selected out of school play, only 38 do engage in physical education at school. The rest are divided according to walking, housework, Masimo and play groups.

3.3 Screen time

Screen time can be attributed to over eating as stated by Lisa Rapaport that a minimum five-hour-a-day habit increased the odds of obesity by 78 percent compared with teens who didn't have TV time. Such heavy use of other screens was tied to a 43 percent greater risk of obesity, researchers report in the Journal of Pediatrics in 2018.

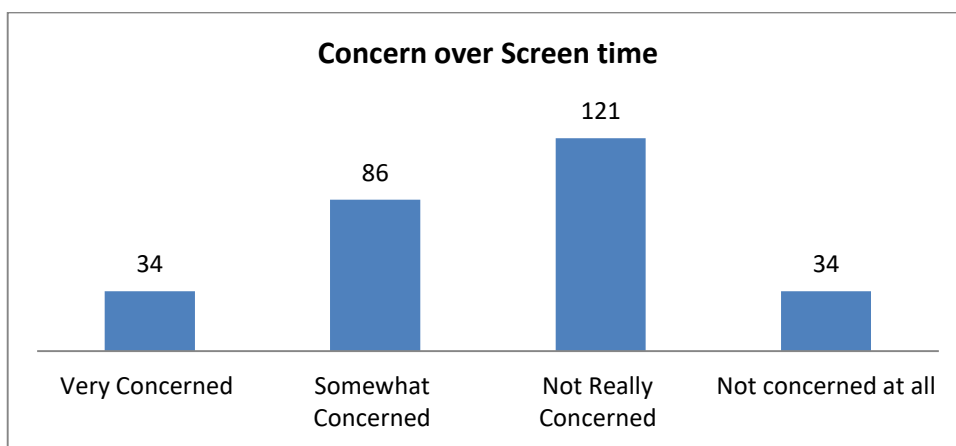


Figure 5. Screen time

Majority of parents and guardians are not concerned about screen time for their children. with 86 parents somewhat concerned and 34 very concerned while 34 others are not concerned at all.

3.4 Time spent on devices

Time spent on devices ultimately leads to obesity. The more time spent on devices, the more food consumed and usually the commonly taken food would be junk food as its convenient and ready to eat.

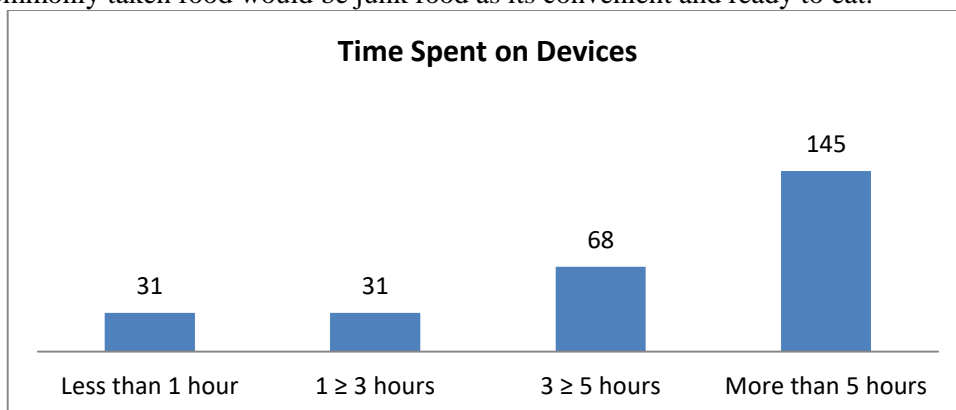


Figure 6. Time spent on devices

Majority of parents have no control over the amount of time the children spent on devices, the study gathered 145 parents who allow their children to spend more than 5 hours on devices followed by parents would allow their children to spend between 3 to 5 hours on devices.

3.5 Eating Out Frequency

Due to parental employment both paternal and maternal children. The house dining room has been abandoned and parents. Children are left to eat fast foods and out in restaurants as it's cheaper and more convenient. Fat, sugar and salt content in food restaurants and fast food places in Gaborone are not regulated and as a result the food may have any of the elements in high quantity that may put the child at high risk of obesity and heart conditions.

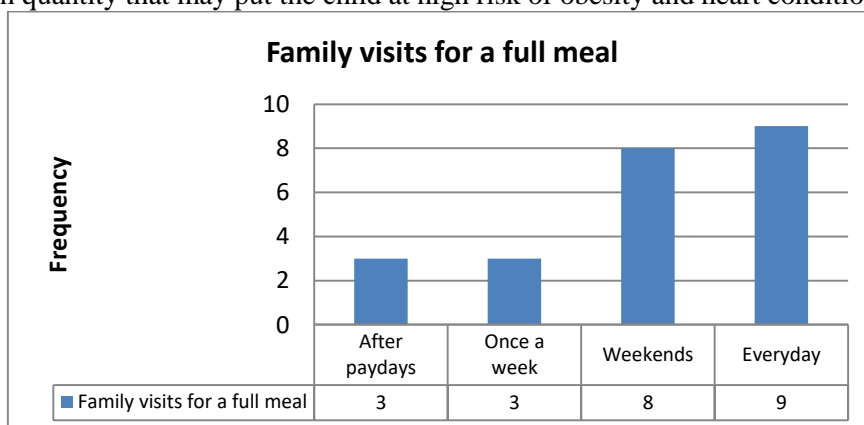


Figure 7. Eating out frequency

Most parents opt to eat out to life demands of work and hardly have time to cook and seat around the dining table in the home. Those that ate out every day topped the charts followed by these that eat only on weekends and those that eat once a week and after pay days only.

3.6 Child Obesity Perceptions

3.6.1 Communities view of causes of obesity

People and family members may hold different views on the causes of child obesity. The question was designed to evaluate what they think is the cause of child obesity at community level considering how life has changed over the years.

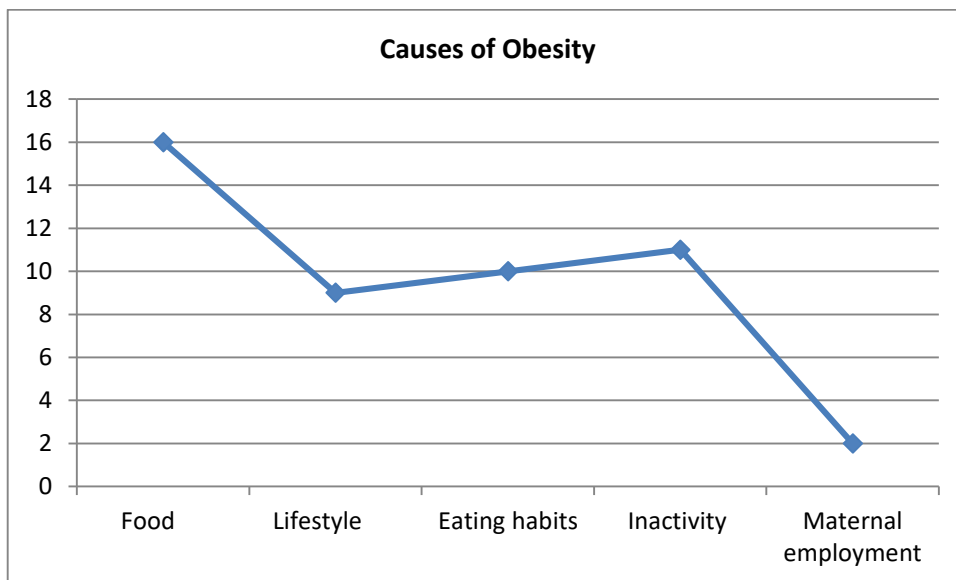


Figure 8. Obesity causes

Food, inactivity and eating habits were the main culprits of child obesity within Gaborone city. While lifestyle and maternal employment were the least selected options.

3.6.2 Fast Foods Booming Business

Fast foods are conveniently located in all city areas some even deliver at the conform of the individuals home, and due to life pressure of work and life commitments people have neglected family home cooked meals and been pushed to eat out almost daily. Fast food restaurants are lucrative business and most outlets have branches all over the city some even having 3 – 4 outlets in the same area but different locations for convenience sake. The question seek to find reasons for fast food restaurants booming within the city of Gaborone and this was asked managers and waiters of the food restaurants.

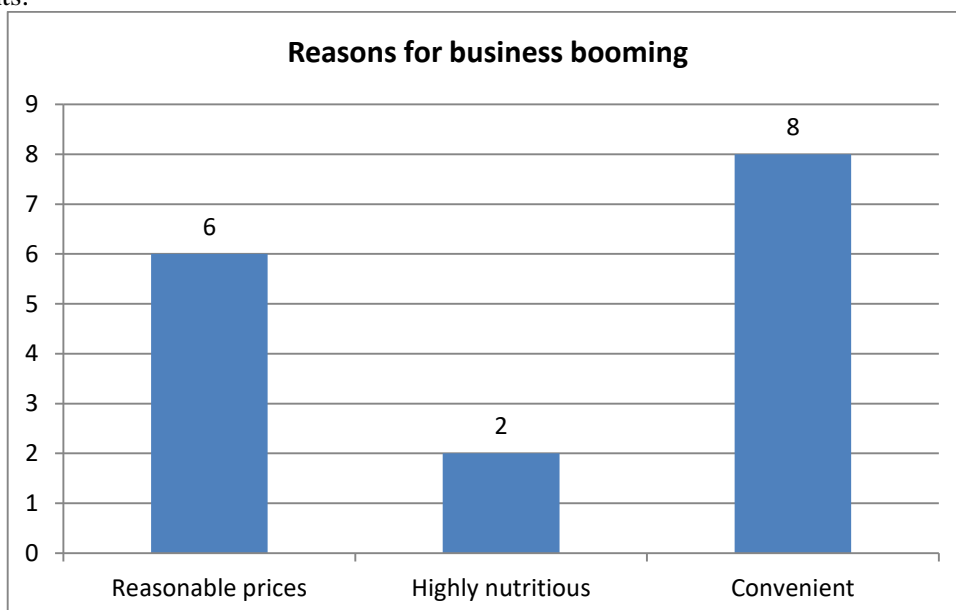


Figure 9. Fast food booming business reasons

8 respondents believe fast foods are booming to their convenience to the customers and has nothing to do with nutritional content of the food served. The second most picked option was reasonably priced as customers will chose a place that's convenient and right price disregarding the nutritional value of the food served.

3.6.3 Reaction To Childs Play

Child play is important and we cannot separate play and dirt. Parents want their children to play and not get dirty to unextend where they buy indoor games to avoid the children playing and getting dirty from outside. The question seek to find individuals reactions to a child returning home dirty either from school or play.

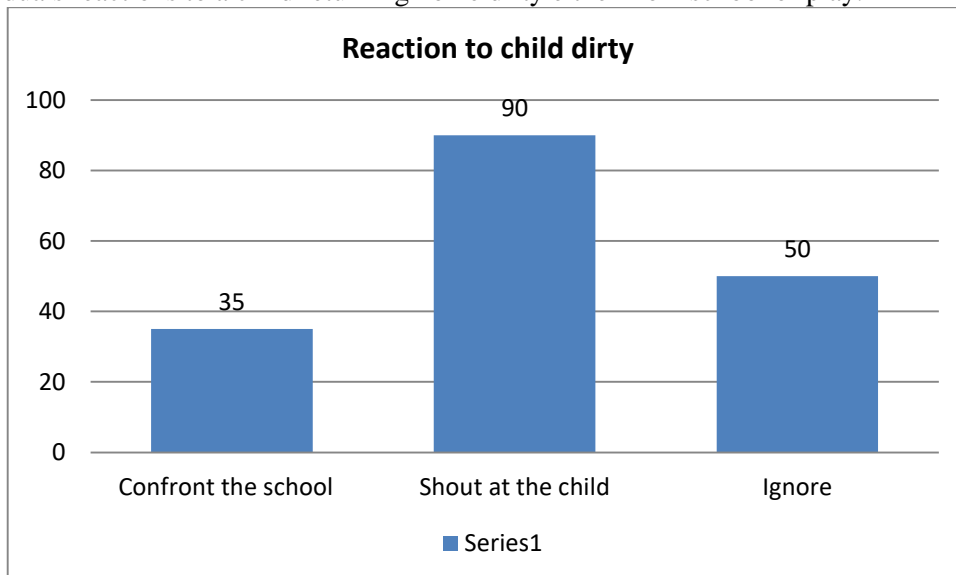


Figure 10. Parents reaction towards child being dirty

Modern parents would react by shouting at the child when they return home dirty from school, 50 would ignore while 35 will confront the school on reasons why the child is dirty.

4. CHILD OBESITY MANAGEMENT:

4.1 Importance of what a child eats

It is said we are what we eat and this is true in that what we eat either makes us healthy or unhealthy depending on the intake, frequency and the quantity. Due to time pressure and also marketing pressure children usually eat ready packed, chips, polony, cheese food that's socially accepted and enjoyed by children may be due to heavy marketing but having no national value. The question sought to find parents and guardians perceptions on the importance of what the child's eat and its effect thereof.

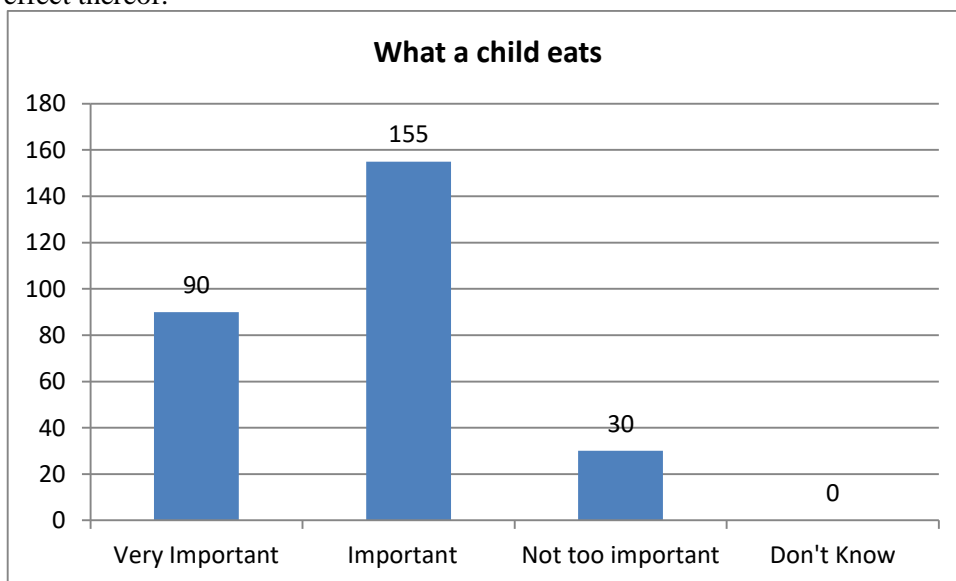


Figure 11. importance of what a child eats

The findings are that majority of guardians and parents believe what a child eats is an important element, while it's followed by 90 parents who say it's very important and the least being 30 parents. The fact that children become

what they eat and it's difficult to reverse what they have become, it's essential to watch what they are eating daily. In order to manage child obesity we ought to be careful what we feed the children, it's not only about what they enjoying eating but the nutritional value in what they are eating.

4.2 Food Choices

There's a battle between becoming our children's friends and parents. This is realized when parents decide to feed children what the child desires and not necessarily what is good for the child. Children copy from friends, see from the television and also what the majority are eating and desire to eat such and the fact that we can't control them we offer them what they fancy.

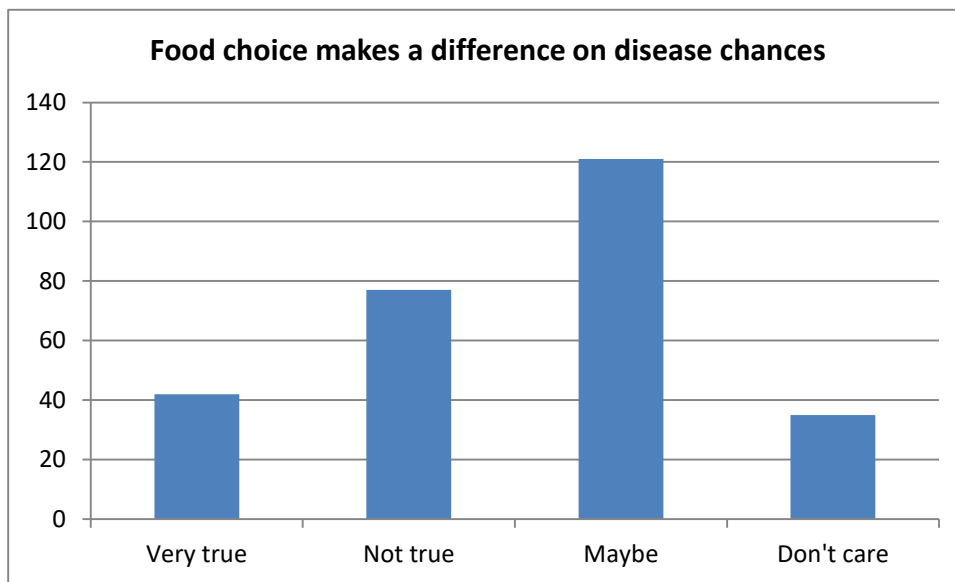


Figure 12. Importance of food choices in obesity

Food choices have an underlining determinant in modeling the child's weight. Most parents and guardians are not sure if food choices has any effect on the child's weight, followed by those that indicated not true and insignificantly those that selected very true and those that don't care. The fact that majority of parents are not sure shows we do have a problem and measures have to be implemented to control obesity from a tender age.

4.3 The food amount

The question sought to find if parents understand and appreciate quantity the effects of quantity of food on the growing child.

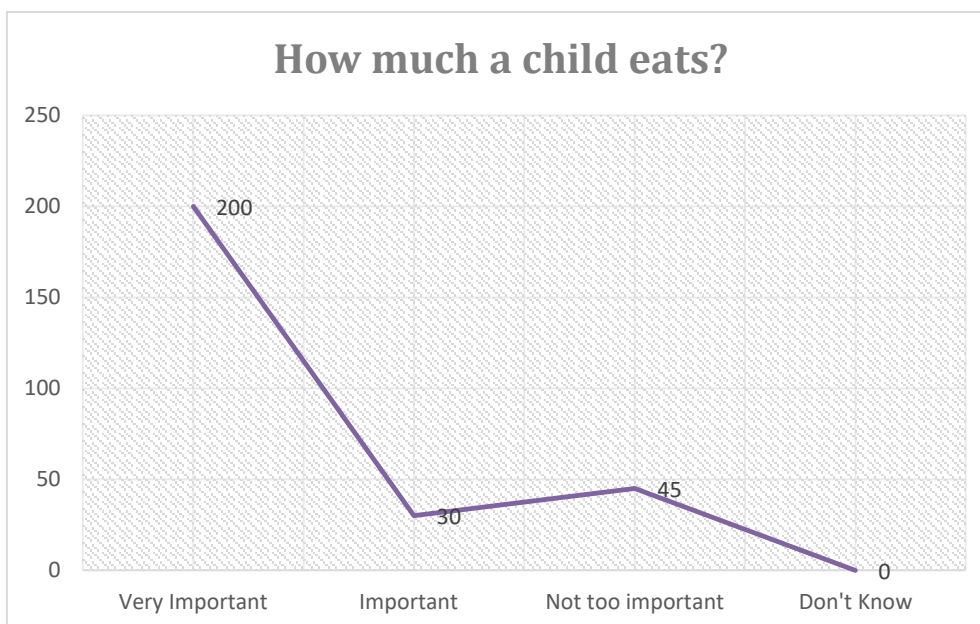


Figure 13. Importance of food quantity in meals

Most parents and guardians agree that food quantity is an important element and should be watched to avoid health complications. The more food a child's eats or the lesser the food has health effects on the growing child's health. 45 parents indicated it's not important while 30 its important and no one on don't know.

4.4 Frequency of eating fruits

Eating fruits and vegetables is an important measure in managing child obesity, they are both nutritious though majority of children don't like eating them. These should be served regularly if not with every meal to combat obesity. The question sought to find the frequency of eating fruits and vegetables in a day.

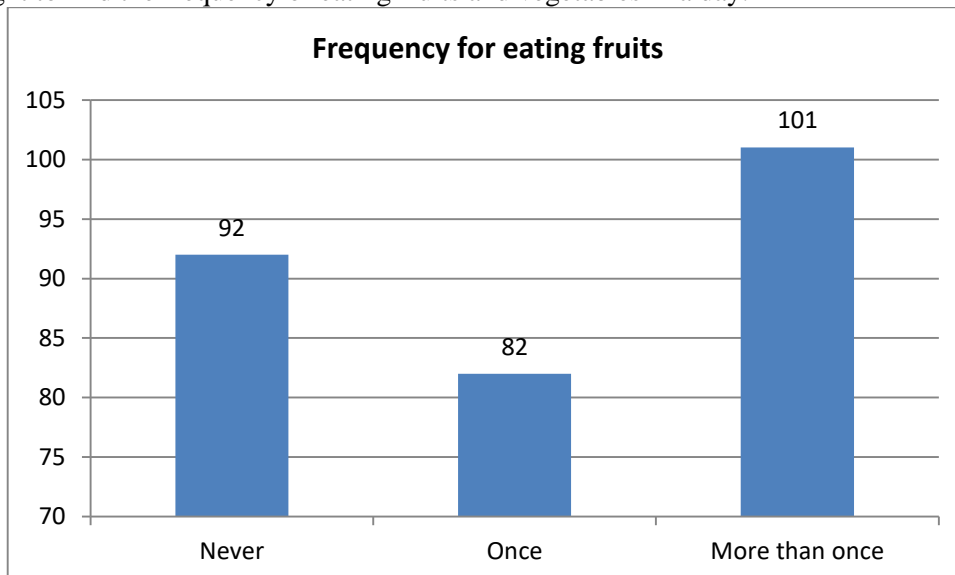


Figure 14. Importance of frequency of eating fruits

101 parents and guardians indicated their children eat fruits more than once daily, while 82 indicated once a day and 92 never eat fruits at all. Creative persuasive ways should be introduced to allow the child to eat fruits and vegetables with zeal every meal as the saying goes and apple a day keeps a doctor away.

4.5 Governments role

Government has an important role on managing obesity at national level. When the government is involved it's easy for all to follow as regulations will be in place and enforced with counter measures for law breakers. The question sought find respondents understanding on the role of government in managing obesity at national level.

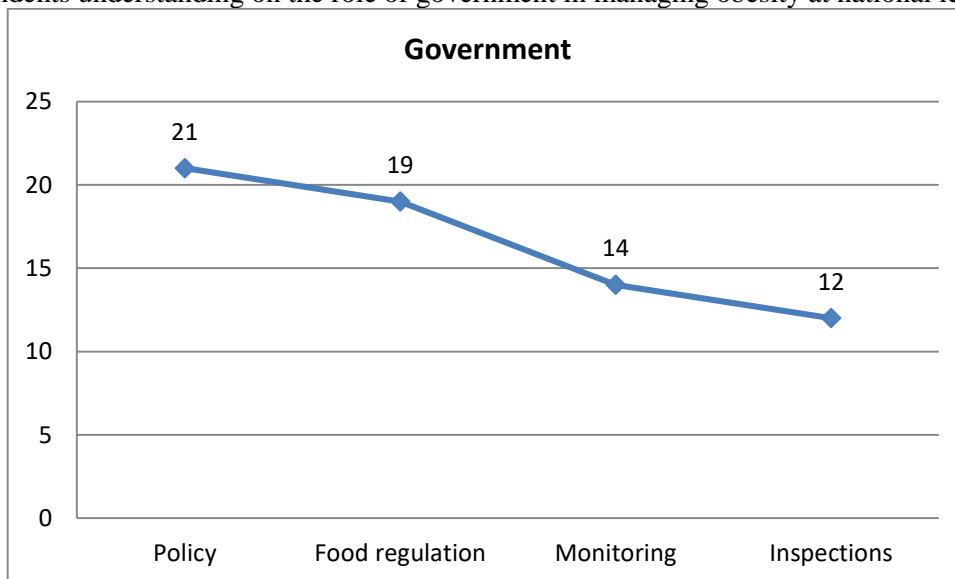


Figure 15. Governments role in managing obesity

The greatest role government can play is to introduce policies that are to be followed by schools, parents, restaurants, fast food shops including importation of food from outside, the second selected was food regulation as we have seen in the developed countries were salt, sugar and fat content are regulated at national level then government can also monitor all regulations that have been implemented and eventually facilities inspected to insure there's compliance at all levels.

4.6 Parents role

Guardians and parents have an important role to play as they decide what to buy for the child, quantity and the quality of food given and the frequency of eating. The question sought to understand the role the parents and guardians can play in managing child obesity at the family level.

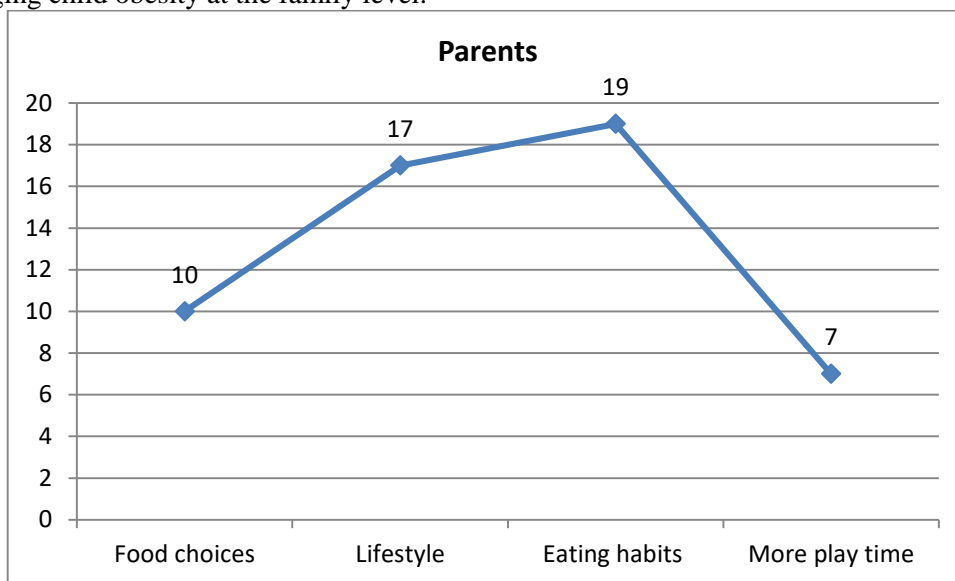


Figure 16. Parents role in combating obesity

19 parents selected their role could be in managing eating habits, while 17 chose they can manage lifestyle of the children to ensure they are active and physical active while 10 chose they can also manage food choices and the least selected more play time for the children. The greatest role lays on the parents as it's their responsibility to ensure children in their care are healthy and free from any health complications including obesity.

5. DISCUSSION OF FINDINGS:

Majority of parents have little understanding of child obesity and the causes. This is due to the fact that Batswana have mixed feelings on child obesity others believe it's prestigious to have a fat child as it's a sign of good living which goes in line with Setswana sayings: "ngwana o fresh" which means a fat child is associated with freshness as opposed to a normal sized child.

With such in mind it's difficult for parents and the community to take stand against child obesity as every parent and guardian would want to have a child that's "fresh" a complete mindset overhaul is essential that will go beyond cultural beliefs on obesity.

Physical activity has revolved over the years. During my time Physical education at school was done outside the classroom while nowadays it's done indoors and most of the time students would be learning as opposed to being active and playing. Parents would want student's home immediately after school with no opportunity for the children to play and when at home they are instructed to play indoors to avoid any levels of dirt.

Indoor games may range from watching television, to playing games and children are not monitored on the amount of time spent in front of the television set or what they are watching and yet this leads to high intake of food. Which is usually junk food as its more convenient compared to adequate meals. The more television programs they watch the more they get to see adverts for fast foods and the more they demand and appetite for these fast foods grow. Most children would have their own desired food they would want to eat and pack for school which is the same with their children and with little nutritional value.

6. RECOMMENDATIONS:

There's need to sensitize people about the high prevalence of child obesity and show them the dangerous of obesity from infant stages to adulthood. Living examples can be used either from around or from the developed world and try relate to where we are going as a country and the ultimate negative effects if we do not initiative immediate strategies. Pictures, advertisements can be used to discourage acceptance of obesity as a positive thing.

Government should develop outdoor play area that haven't been utilized for a very long time and are now home grounds of predators and negative activities such as drug sale and misuse. If these parks can be developed and taken care of or even privatized. They would be suitable for use to all toddlers, give an opportunity to the under 5 to have an outdoor play centre.

Parents and guardians should not use the television as a getaway from parental responsibility and looking after the little ones. Television and device time should be monitored and managed to avoid children spending too much time watching television and playing television games. Unmonitored tv time does not only lead to obesity due to the constant

eating but also the common culprit of violence among under 5 as they watch and play violent games that eventually moulds their behaviours. This has also affected classroom participation levels as such children don't participate in class but opt to hear answers from other students as the television doesn't not give an opportunity to reciprocate only watch what it has to offer.

Schools should encourage parents to pack nutritional foods for their children. Most schools have a nutritionists some are monitored by nutritionist from the government. Monitoring meals would eventually to all parents packing healthy meals for their children and all children eating healthy.

Physical education should be more of practical than theory. Play time should be included in the curriculum of children to encourage the physical aspect of the children as most of them are not physical at home. Outdoor play should be a must and included in the school time table.

Its high time government regulates foods imported into the country and also served in fast food restaurants. The fast food we eat has high fat content, sugar and salt and majority of food we buying even in the supermarkets is preserved with sugar and salt which increases the sugar and salt content. When government can set limits of sugar, salt and fat content and monitor such, would lead people eating healthy.

Family time should be revitalized. Over the years due to work pressure and maternal employment, families are no longer eating together home cooked meals and I fear for the generations to come as parents are not teaching their children to cook which could only mean families will rely on eating out which is not only costly but unhealthy. Family time also allows parents to know what's going on in the child's school life, give them life nuggets to face life's challenges and also assist them with school work.

7. CONCLUSION:

Child obesity is a current problem and the residents being parents, guardians, shop owners, restaurant operators and gym instructors haven't accepted the magnitude of the problem. It's ideal to sensitize people of the problem and establish adequate controls through engaging the relevant stakeholders before the situation gets out of hand.

i): What Socio-economic determinant factors influence child obesity in the city of Gaborone Botswana

The study established that maternal employment, lifestyle, food, buying and eating habits are the number one contributors of child obesity. Lack of outdoor facilities and lack of governmental food regulations also contribute to high prevalence of child obesity in the city of Gaborone.

ii): What are the different Obesity perceptions held by members of the public in the city of Gaborone Botswana?

Cultural values and believes have clouded judgment on child obesity in that residents of Gaborone or Batswana in general believe a child should be fat in order for the family to be considered wealthy, in such child obesity is not seen as a problem.

iii): What is the contribution of fast foods to child obesity in the City of Gaborone Botswana?

Fast food restaurants are a major contributor of child obesity in that most families have no time for family meals and rather chose to eat outside in restaurants and the restaurants are not regulated as the food offered is oily, has high sugar and salt.

iv): What is the significance of this research to the economy of Botswana and relevance to current obesity trends in the city of Gaborone?

Obesity is not recognized as a serious problem in Gaborone and Botswana, with this research the recommendation will assist in sensitizing residents on the high prevalence of obesity and how it affects the nation at large.

v): What is the implication of maternal employment to child obesity in Gaborone Botswana?

Mothers are the strong pillars of any family. Once the mother is fully employed chances of food being compromised is high in the family. Majority of families have lost the right to eat at the dinner table and rather chose to eat out as it's convenient.

REFERENCES:

1. Anrig, C. (2003). The obese child. . *Dynamic Chiropractic*, 27-31.
2. Atinson, P. (2012). Preventing childhood obesity during infancy in UK primary care: a mixed-methods study of HCPs' knowledge, beliefs and practice. Availabl. *biomedcentral.com*.
3. author, i. (2010). obesity . *national institute of diabetes and digestive and kidney Diseases*.
4. Bala, M. (2009). Data Analysis Procedure. *Online Research Methods Resources for teachers and trainers*.
5. Botswana, s. (2015). data portal. *Demography of Botswana*.
6. Dc, N. (2004). Exercise,nutrition and immune function. *pub med.gov*.

7. Finkelstein, F. &. (2003). the obese child . *public health issues*.
8. Kempster, L. (2004). .Declaring war on obesity: a fight that can be won. . *Imerge Consulting*.
9. Kuntzman, G. (2004). American Beat: Physically Unfit. *news week*.
10. NEWS, B. (2008, JANUARY). <http://shiramelissa.blogspot.com/2012/06/childhood-obesity-on-global-level.html>. Retrieved from <http://news.bbc.co.uk/2/hi/health/7151813.stm>.
11. Nutrilite. (2013). *Botswana the changing face of malnutrition*. Gaborone: Euromonitor International.
12. Pienaar, A. (2015). Childhood obesity in Southern Africa. *BMC OBESITY*.
13. Rible, L. (2014). <http://www.ncdrisc.org/>.
14. Roulette, R. (2015, january 31). Retrieved from <https://www.economist.com/graphic-detail/2015/01/31/russian-roulette>.
15. Sarah A Redsell, P. A. (2010). Parents' beliefs about appropriate infant size, growth and feeding behaviour. *implications for the prevention of childhood obesity*.
16. Willms, J. (2003). Geographic and demographic variation in the prevalence of overweight Canadian children. *Obes*, 668-673.