

## The Nigerian Built-Environment and Childhood Obesity

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**Abstract:** Childhood Obesity, previously a feature of the industrialized nations is now prevalent in the developing countries. The grim health index and the poor condition of the Nigerian built environment which is unable to tackle the epidemic were examined. This study explores how the physical environment at home, in the neighborhood and at school can help promote physical activity and thus prevent obesity. Infrastructure planning is presented as a strategy of increasing the level of physical activity among children. With generous support from educational managers, physical planners, politicians and policy makers, it is believed that a positive index would emerge.

**Key words:** Educational facilities, neighbourhood, transportation, recreation

### INTRODUCTION

The task of shaping the built environment cuts across many disciplines such as architecture, civil engineering, urban and regional planning, geography and environmental management, economics, sociology. It is also usually targeted to achieve certain goals and fulfill certain theme which satisfies the entire citizenry and needs of the peculiar groups of children, aged and disabled.

Children most especially deserve pro-healthy environment (the product of a multidisciplinary synergy) which allows for holistic development. This is not only falling in line with recent global advocacy by international bodies such as the Child Friendly Cities Initiative (CFCI) of UNICEF/UN-HABITAT but also because one of the best indicators of a wholesome built-environment is the well-being of its children. Little have however been achieved in the developing world in this regard therefore this study delved into how the physical space can assist to eliminate or reduce certain disease and encourages healthful lifestyle in children.

**The obesity epidemic:** Obesity is defined as a body condition characterized by excessive or abnormal fat accumulation in the fat tissues (adipose tissue) under the skin and within other organs (European Food Information Council, 2004). All mammals store body fat, but obesity usually ensues when there is a positive energy balance, -when more calories of energy are consumed than expended in activity leading to weight gain. However, it is an interaction of nutritional, behavioural and genetic lead to childhood obesity.

A healthy weight can be determined through the Body Mass Index (BMI), a simple measure of relationship between weight and height (Table 1). Childhood Obesity is often defined as a weight to height in excess of 120% of the ideal; however skin fold measures could be more accurate. Four sensitive periods have been linked with the development of obesity: intra-uterine life, infancy, the period of adipose rebound (5-7 years) and adolescence (Money, 2001). The beginning of obesity during one or more of this period appears to increase the risk of persistent obesity during later life (Eboh and Boye, 2005). The fact that it is a key factor in the development of Coronary Heart Diseases (CHD) such as non-insulin dependent diabetes mellitus or Type 2 diabetes, cardiovascular and gall bladder disease, hypertension, some cancers therefore incites an alarm towards prevention which is far better and easier than its cure.

Presently childhood obesity has assumed a global epidemic dimension, thus presenting a public health challenge in the 21st century. Between 1974 and 1984, levels of obesity and overweight among children showed little change. In about a decade after, it increased by a magnitude of 2-3 times in developed countries (from 11 to over 30% in boys in Canada) and up to almost 4 times in developing countries (from 4-14% in Brazil), (Flym *et al.*, 2006).

**Table 1: BMI values**

Body Mass Index (BMI)	Remark
< 18.5	Underweight
18.5 -25	Healthy weight
25-30	Overweight
>30	Obese

Source: European Food Information Council (2004)

Health Index available from studies conducted here in Nigeria are grim as well. Owa and Adejuyigbe (1997) examined 904 Nigerian children of between 5 and 15 years old; male and female of equal percentage. The body fat mass, body mass index and mid-upper arm circumference were determined while 18% of them were discovered to be obese based on US standards 164. A future medical problem was then foreseen with improved living standard in the country. After some time, Ansa *et al.* (2001) studied 1005 randomly selected children and adolescents aged 6 and 18 years using the profile of body mass index. The prevalence of obesity was found to be 2.3% in 6-12 years, 4.0% in 13-15 years and 3.0% in 16-18 years. Females had a higher prevalence in the latter group but the difference was not statistically significant. However, Afaire (2001) reported a more significant difference as he documented the prevalence of childhood obesity among urban girls ranging from 0.9 - 21.4% and boys 0.9-12.9% aged 6-13 years.

Williams (2002) also revealed that surveys of 4-year old children showed 5-10% prevalence of obesity in Nigeria. In the same vein, Adeleke (2005) in a survey of Nigerian school children found the prevalence of childhood obesity to be more among children of the higher socioeconomic class. A 16.7% was found among males while a 20% occurrence was found among females, reiterating the gender difference. A study also conducted by Eboh and Boye (2005) in the Niger-Delta region revealed a high percentage of body fat mass. They noted a 16.8-15.3% in stunted children and 15.6 and 14.9% normal children, respectively. The above figures confirms Muoboghare (2003) who indicated that children of all ages are fatter than they were 25 years ago even in a developing country like Nigeria and hence the need to nip it in the bud.

**Built environment and physical activity:** Any effort to understand or tackle childhood obesity must consider the built environment. This is because the shape buildings, transportation infrastructure, elements of land use and community design and recreational facilities are strong correlates of physical activity and healthful lifestyle. A number of studies have shown what simple logic could have suggested the children and even adolescents with access to recreational facilities and programs near their homes are more active than those without such access, (Sallis *et al.*, 2000). Afaire (2001) and Hong *et al.* (1998) also observed that the combination of densely populated urban areas and shortage of recreational spaces limit the potentials for outdoor exercise. Though gender differences are possible but the fact is that children and adolescents are more active when there are more places nearby where vigorous play is welcome and when they spend substantial amount of time in those places.

In another dimension, when using objective measures of total physical activity as Frank (2005) did, it was found out that residents of high walkable neighbourhoods get 1 h more of physical activity each week and are 2.4 times more likely to meet physical activity recommendations. This must have been the reason why Ewing (2003) documented lower BMI or reduced risk of over weight and obesity in people living in these walkable areas.

## **THE NIGERIAN BUILT ENVIRONMENT: CONDITION AND POSSIBLE INTERVENTIONS**

**Individual housing unit and neighbourhood:** Since, children spend more time at home, house forms and neighbourhood configuration can then be explored as a means of encouraging active play. Research has revealed that children do much playing along corridors, lobbies, balconies and terraces. These spaces therefore, must not be absent, must be proportional in size to the population of children in the dwelling unit, must be appropriately positioned and well protected from adverse environmental conditions peculiar in the country.

Araromi, Odo Ijoka and Imuagun are neighborhoods in the core area of Akure, the capital city of Ondo State, Nigeria. A larger percentage of the urban poor live in the core area of the nation's cities; which constitutes the inner-city neighbourhoods. The three neighbourhoods were studied together to represent the low-income neighbourhood and the land use pattern was discovered to be unwholesome. Table 2 shows the distribution of building and structure's use. With no provision for recreation facilities the gregarious children often play by the streets, on undeveloped land, in building uncompleted/ building under construction or on some accidental open or left over spaces. This amorphous arrangement have however been counterproductive or at the best minimally productive. The play groups have at times been hijacked by miscreants to mobilize followers, while deviant behaviour and even nefarious activities are sometimes carried out and found to thrive in such recreational arrangement.

Neighbourhoods with dwellers of higher socio-economic status are also not spared by this infrastructural deficiency. There are eight government housing estates scattered across Akure metropolis, 4 public-private partnership estates which is on course and a number of informal privately developed mass housing schemes. The former ones often have spaces dedicated for active recreational purposes and open spaces, but they have not been fully developed. These resources are not fully tapped because of economic (affordability) and locational (accessibility) factors.

Therefore, facilities for active recreation should be strategically located for accessibility: an average of

5m<sup>2</sup> per dwelling unit and located in connections with communication systems. There are recommended guidelines for planning and locating this in any neighbourhood. This is particularly for high-income neighbourhood whose children are prone to sedentary recreation behaviours such as watching television and videos, using computers, playing video games and so on. With proper economic apparatus in place, low-income neighbourhood can also benefit from such facilities. This would reduce exposure to danger experienced by the children who resort to playing on the streets and vehicular routes.

**Community and urban infrastructure:** The term infrastructure has come to mean all things to people in many communities. The differences in its availability and distribution across urban centres give a basis for comparison of the overall quality of life. Access infrastructure and transportation uniquely has an all-pervasive correlation with communication, human mobility and material progress. Research thrusts in this field over the years have been directed towards reducing traffic congestion, better connectivity and network, improving air and environmental quality. However, lately its correlations with physical activity and the plethora of issues involving begun to emerge.

Before the middle of the twentieth century, a number of Nigerian communities were configured to support mainly convenient pedestrian travel for common activities such as going to farm, shopping at market etc. Mabogunje (1980) earlier noted that a number of ethnic groups, especially the Yorubas have lived in large urban communities with unique and intriguing 'intrinsic' structure long before the coming of the Europeans. The coming of the colonial masters however saw the emergence of a new and the current urban system. Streets were laid out in grid pattern that creates higher level of connectivity and offered the pedestrians more direct route from one place to another. Low traffic residential streets also fed into high speed arterial streets, which afterwards, presented some barriers to pedestrians. The widespread use of automobile as a mode of transportation and status indicator also increased the spatial complexity of the urban environment.

These complexities, more than anything impinge on the health index of the populace and more especially the vulnerable groups of children and the aged. Transportation corridors, which has high potentials to achieve some respite, is in deplorable conditions. The bias has been essentially to automobiles (which adduces to sedentarism). Such metropolis for this bias can be dubbed incomplete.

Completing the street therefore, means routinely accommodating travel by all modes. The Complete Street concept provides choices to people who live, work and

travel on them. It is also essential for access by people who cannot drive—mostly the disabled, the older people and children (America Bikes, 2007). This is not only beneficial for safety, but helps as a response to the obesity epidemic. Macbeth (1999) noted a 23% increase in bicycle traffic after installation of a bicycle lane; Giles-Corti and Donovan (2002) revealed that residents were 65% more likely to walk in a neighbourhood with sidewalks; Staunton *et al.* (2003) found a 64% increase in walking and a 114% increase in cycling to school as more sidewalks and improved street crossing were provided; while Jacobsen (2003) explained that as the number and portion of people bicycling and walking increases, deaths and injuries decline.

**Educational facilities:** The logical point where educational planning begins in any community and interfaces with spatial planning is in the location and distribution of schools. The traditional and normative idea is to ensure even distribution of schools so as to ensure a reasonable time at commuting to school. With this limited travel distance, it is expected that the children are able to walk or cycle to school. This increases their level of physical activity reduces excessive body weight and develops physco-motor skills which relates to the third domain in educational taxonomy. However, the realities of violence, crime and kidnapping, fast-moving traffic, lack of sidewalks, poorly marked or dangerous pedestrian crossing in the nation challenge this possibility.

On a smaller scale intervention can come through the architectural design of schools otherwise known as School physical plant planning, which Castaldi (1977) notes begins with a clear description and understanding of the intended educational programme and the institutions philosophy. Such programme would include physical and health education. Most Nigerian primary schools have one form of recreational resource or the other, but are grossly inadequate or in poor conditions. The poverty profile, population explosion combined with the low public investment in education has kept back active recreation from its rightful place among children.

The public schools, which had hitherto enjoyed considerable recreational land spaces, are facing some challenges which are fallout of the fast paced urbanization experienced in the country. Property development activities of affiliated agencies, contravening moves of land speculators, need for unforeseen expansion to mention a few are reducing the land size of play area available which cause the dwindling of adequate physical activity.

The explosion in the number of private schools to meet the shortfall in supply of educational services and as a business enterprise left little space for active recreation and sports among school children. Omoregie (2005) noted

**Table 2: Land use pattern in akure neighbourhood**

Land use	Percentage of usage
Recreational	0.00
Educational	1.36
Under construction	4.07
Religious	4.52
Mixed	19.90
Commercial	18.10
Residential	52.04

Source: Field survey (2005)

**Table 3: Guidelines for planning playground in neighbourhood**

Age group	Space per person(m <sup>2</sup> )	Distance from home (m)	Walk time from home(min.)
0-6	0.6	110-230	2
6-12	0.5	350-450	5
12-18	0.9	700-1000	15

Source: Neufert Architects Data, 3rd Edn. (2000)

**Table 4: Inadequacy of facilities in Ibadan private schools**

	Adequacy (%)	Inadequacy (%)
The Environment	37	63
Sport Facilities	27	73
Nursery Playground/Facilities	47	53

Source: Onuka (2005)

an 82.6% inadequacy of sport facilities in private schools of Esan West Local Government Area of Edo State, Nigeria. Onuka (2005) found out the same trend in his survey (Table 4). The children are brought to school in their parents cars or school buses. They are usually kept nearly on the same spot for hours of the day in school buildings planted on site of land size that gives little or no chance for physical education. Inter-house Sports competition and other physical activity oriented programs are not frequent features because there are no facilities and hence a poor humanokinetic lifestyle.

To make ends meet therefore, generous contribution and support can be sought by both public and private schools from non-governmental sources such as Old Students Association, Parent Teacher Association (PTA), Clubs and Societies, Philanthropists, Corporate bodies and Non-Governmental Organizations (NGO). This would serve as communal contributions that would augment the school management effort at providing the necessary recreational/sporting facilities.

Furthermore to achieve the goals of adequate physical activity among children the principles of proportion, attractiveness and safety must guide physical planning and materials preparation endeavour notwithstanding the daunting challenge of urbanization, short supply of land and depressed economy.

**Proportion and attraction:** Both indoor and outdoor spaces in the school are useful for play during recess break, before and after school; the need for appropriate sizes for these spaces. Draughts excluding lobbies, entrance area, corridors, stairs, ramps etc are such interior space and a 0.5 m<sup>2</sup> per pupil is recommended. Playground

and other exterior play area in school sites should not be less than two metre square per pupil. It should be arranged to cater for children's gregariousness and even allow for simultaneous acquisition of cognitive skills.

However, It goes beyond proportionate space to promote active recreation in children. The attractiveness of play area, its context and content (this also goes for physical activity programs) would incite, promote, discourage or prohibit play in pupils. Design proposals for school buildings and outdoor environment, play equipment and facilities must therefore incorporate very interesting forms, texture and finish. For example, curvilinear/centroidal forms can be solely employed or nicely juxtaposed with linear forms while warm advancing colours are satisfactory as finishes. Also the floor areas should be soft, grass preferably.

## **POLICY IMPLICATION AND RECOMMENDATIONS**

From the inextricable link unveiled between built environment and obesity in children and adolescents; the policy implication is palpable. Though study in this area is relatively new particularly in the developing world, frontally tackling the epidemic before it gets out of hand is however very important.

Educational Management Authorities at all levels and the Urban and Regional Planning Board hold a prime place at ensuring adequate spatial provision for physical activities in schools. This could be achieved during approval process for the establishment of new schools. Buildings and other physical plant provided must be properly accredited to ascertain its adequacy. The idea of relying on community's sports facilities is obnoxious and should therefore not be entertained. A regulation exercise for the existing schools is recommended. This could be done alone or incorporated with the built environment audit recently canvassed by the Nigerian Institute of Architects (NIA). However, undue politicking, financial inducement and personal interest must be eschewed for efficacy. Also participation in Physical and Health Education programs should be made compulsory, regular and interesting in schools. It must be an integral part of the nascent Universal Basic Education (UBE) program of the Federal Government.

The need to incorporate a holistic approach in infrastructure planning and management is germane. Planning for new towns, cities and housing estates, upgrading and renewing of slums and squatter settlement, opening and construction of new roads, rehabilitation and extension of old ones must incorporate the Complete Street concept to make provision for pedestrians, biking and other active commuters. This is not only pro-health

but a cost-effective mechanism in urban transportation. Master plan and development regulation must also be adhered to particular as it regards open spaces, recreational facilities and green areas.

### CONCLUSION

The epidemiology of childhood obesity and the potentials shapers of the built environment possess at tackling it have been examined. With further research and continued advocacy the issue would be brought to limelight and the hope of positive index available. Though, translating the research into reality in the built environment would be challenging, the benefit however would be surpassing and long-lasting.

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