

Sedentary Lifestyle: Health Implications

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Abstract: Sedentary lifestyle is an issue of great concern because of its deleterious health implications in developed and developing countries. It is associated with limited physical activity, prolonged sitting at work, in cars, communities, work sites, schools, homes and public places have been restricted in ways that minimize human movement and muscular activities. People sit more and move less. This shift from a physically demanding life to reduced physical activities have exposed people to high risk of developing various health conditions such as obesity, hypertension, cardiac disorders, vitamin deficiencies, cancers to mention but a few. They are associated with unhealthy lifestyles which are preventable. This paper therefore discussed the concept of sedentary lifestyle, factors that enhance it and the various health implications associated with this unhealthy behaviour. The paper concluded that individuals, groups and communities should make concerted efforts to engage in physical activities, modify their dietary habits and avoid other risky behaviours that affect their health negatively. Suggestions made by the paper include among others that work/public places should be structured in a way that enhance active movement and recreational activities

Keywords: Sedentary Life Style, Cardiac Disorder, Physical Inactivity, Obesity, Hypertension, Cancer.

I. Introduction

Man was created to be active and energetic hence sedentary life style is contrary to human nature. Our grand parents were also active and engaged in vigorous muscular activities like fishing, farming, hunting, tapping and migrating from place to place hence they lived stronger, healthier and longer. Health as a quality of life is the result of diverse factors and behaviour/life style is one of the most powerful determinants of health [1] According to Brannon and Feist most deaths in the 20th and 21st century result from diseases that are associated with individual life style/behaviour. [2] A relationship between Sedentary Lifestyles and ill health was revealed as early as the 17th century by Bernadino Ramazzini, an occupational physician who discovered that sedentary life style with its associated physical inactivity has an adverse effect on human metabolism, cardiac out put, physical function and well being[3] . Technological advancement and increase in knowledge have provided man with so many facilities that reduce physical and muscular activities such as cars, airplane, accelerators and a corresponding increase in the amount of time spent sitting down at work place, school, home and public places.

Despite the well known benefits of physical activity, many adults and children lead sedentary life styles. It has been revealed that most urban dwellers adopt sedentary life styles which have obvious negative health implications [4]. The health belief model explained that people will be willing to adopt a positive behavioural/ lifestyle change based on six constructs; Perceived Susceptibility, Perceived Severity, Perceived benefits, Perceived barriers, Cues to action and Self efficacy [5].

This theory postulates that people's perception and belief about their vulnerability or proneness to a disease condition have great impact on their willingness to adopt a positive lifestyle. Another theory that explains lifestyles is the social theory of life style which sees life styles as the life of a people, mode of behaviour, habits, beliefs, rituals, it explains that what people do in different places and times affect them positively or negatively [6]. According to a survey report conducted in 2008, by the United States national Health Survey [7], 36% of adults are totally inactive while 59% have never participated in vigorous physical activity lasting more than 10 minutes per week. This ugly trend has led to higher risk of various chronic diseases such as obesity, deep vein thrombosis, heart diseases, Type – 2 diabetes, osteoporosis, cancer, muscle and skin disorders among others with their resultant increase in morbidity and mortality. [8,9]. It is sad to note that many well meaning citizens of our country and beyond are victims of these chronic diseases which would have been prevented if they had adopted more healthier life styles. The aim of this paper is therefore to investigate the concept of Sedentary Behaviour (Lifestyles), examine the factors that enhance it, identify and discuss the health implications of Sedentary Life Styles as well as make necessary suggestions to curb this trend.

Concept of Sedentary Life Style

The word "Sedentary" is coined from the Latin word "Sedere" which means "to sit" hence Sedentary behaviour is a term used to characterize those behaviours that are associated with low energy expenditure. This includes prolonged sitting at work, home, business centres, long screen time, car driving and leisure time [10]

Sedentary Life Style is type of lifestyle which an individual or group adopt that do not permit regular physical activity. A person who lives a Sedentary Life style may be known as a “Couch Potato” This term was invented by a comic artist Robert Armstrong in the early 70’s. He showed a group of couch potatoes in his series of comics that featured Sedentary characters who constantly watched television as a form of meditation. Through various publications in newspaper, magazines and broadcasts, this term “Couch Potato” became very popular as one characterized by inactivity and long sitting.

Sedentary Lifestyle as distinct class of behaviours is characterized by little or no physical movement and low energy expenditure less than 1.5 METs (Metabolic Equivalent Task) MET is used to assess the energy expenditure during activities. Running expends energy worth 8 METs, brisk walking has a value of 3-4 METs while Sedentary behaviour is any activity that expends less than 1.5 MET. They explained further that some individuals are classified as Sedentary because of physical inactivity while others are classified based on their engagement in activities that do not require high energy consumption. Researchers rely on various approaches to quantify Sedentary behaviour. This includes; Car time, Chair/Sitting time, Indoor time and Screen time [11,12]

Factors that Enhance Sedentary Life Styles

Technological Advancement

Routine manual jobs have been substantially reduced due to technological knowledge, mechanization, automation and computerization, work organization, and house hold chores have been simplified by use of computers of all kinds and machines that reduce physical activity thus enhancing Sedentary Lifestyles. Adolescents spend a notable amount of time using the computer, which is unfavorably linked with assimilation of health-related determinants such as life appreciation, health responsibility, social support, and exercise behaviour. [13].

Demographic Factors - Age and Gender

Sedentary behaviour increases during childhood and from childhood into adolescence. In young children (less than ten years), TV viewing and computer use do not appear to differ between boys and girls. During adolescence, there is some evidence to suggest boys typically spend more time than girls watching TV or using a computer especially playing computer games [14].

Ethnicity and Socio Economic Status

Socio-economic status (SES) such as parental income or education, are inversely associated with sedentary behaviour (ie, sedentary behaviour tends to be higher in low SES groups). Levels of TV viewing are typically higher in ‘non-white’ ethnic groups, eg, African-American. Young people tend to have higher levels of sedentary behaviour if their parents or siblings also engage in high levels of sedentary behaviour. Having more television sets and computers within the home and having a TV in the bedroom is also associated with higher usage. Parental rules regarding TV and computer use are associated with lower levels of participation in these behaviours for young people[15].

Long Working Hours

The average worker spends between 8-10 hours on duty with little or no time for recreation and exercise. This is evident in developing and under developed nations where employee welfare is undermined. The workers are engrossed with long sitting, reading, operating computer sets, manipulating machines, attending meetings and at the close of work, drive home under heavy traffic jam (common with Nigerian workers). These prolonged sitting period promote sedentary lifestyle. (minimal movement with low energy expenditures).

Health Risks Associated with Sedentary Lifestyle

Obesity

World Health Organization (WHO), identified obesity as a worldwide public health problem affecting over 100 million people. Reduced physical activity which characterizes Sedentary Life Style leads to accumulation of excess calories and fatty acids. This is because weight maintenance depends largely on the number of calories absorbed through food intake and the number expended through physical activity and metabolism. Lucas, Ward and Brain (2008) identified Sedentary lifestyles as a major cause of obesity in both male and female workers. An individual, who is sedentary, absorbs and stores a lot of calories because of reduced energy expenditure. These unwanted calories lead to obesity [16].

Obesity is a disease associated with excess body fat to such a degree that the individual’s health may be adversely affected [17]. They identified obesity as a lifestyle associated with globalization which brought a lot of changes in food habits of both children and adults because of little or no muscular/physical energy expenditure. They described some methods of assessing Obesity such as: Skin Fold Thickness, Body Mass

index and Waist circumference and waist hip ratio (WHR). Skin Fold Thickness This shows the degree of fat deposits using Triceps skin fold and sub scapular skin fold measurement.

A caliper called “Harpenden Caliper” is used for this purpose. Body Mass Index this is calculated using the individual’s body weight in kilograms divided by the height in meters ($BMI = \text{Kg/m}^2$) the national task force on the prevention and treatment of obesity defined overweight as BMI of 25 – 29.9 and Obesity as BMI of 30. Waist circumference and waist hip ratio (WHR). This method is used to assess fat distribution using ratio of waist to hip size. People who have a waist hip ratio exceeding 0.85 in females and 0.9 in males are said to have abdominal obesity.

Sedentary Lifestyle and Obesity in Children

There is a strong relationship between number of hours of screen time and obesity in children and adolescents. TV viewing, video and computer games are risk factors for obesity in children and adolescents especially in this computer age [15]. Obesity has been identified as one of the emerging problems of the younger age especially those in urban areas due to availability of amenities and over-eating tendencies. Obesity in children and adolescents are associated with health risk of insulin resistance leading to type 2 diabetes. Other health risks of obesity in children include gall bladder stones and heart disease [18].

Sedentary Lifestyle and Obesity in Adults

Between 50 – 75 % of adults aged 35 – 64 are either overweight or obese among the European population [16]. Obesity is also a major health problem in developing countries due to its high morbidity and mortality rates. In Nigeria, the prevalence of Obesity among adults ranges from 20.3% - 35.1% as at 2012. In Nigeria, which is the most populous African country, the increasing changes in lifestyles resulting from enhanced technology and automation have led high incidence of obesity. Low physical activity at work is a significant risk factor for obesity [17].

Obesity is a disease associated with other myriads of ailments such as hypertension, diabetes, cancer, osteoarthritis to mention but a few. It also has a high morbidity cost which is the value of income lost from decreased productivity resulting from absenteeism, reduced output, hospitalization and mortality cost resulting from premature death of obese patients. In America, the total cost was 147 billions dollars in 2008 [16]. Though there is no documentation of the morbidity/mortality cost of obesity in Nigeria, the adverse effects is still obvious.

Sedentary Lifestyle and Type 2 Diabetes

It is a well known fact that physical inactivity plays a key role in diabetes mellitus especially type 2 which was formally known as non – insulin dependent diabetes which results from the body’s inability to effectively utilize insulin. Sedentary behaviours such as prolonged screen time, sitting time, driving and reading time among others are behaviours strongly associated with increased eating and weight gain which favour diabetes mellitus [2]. People who spend more than 40 hours per week on screen (TV, video, computer etc) are 3 times at risk of type -2 diabetes compared to those who spend less. This is due to the reduced physical activity and unhealthy eating patterns associated with screen times especially TV watching.

It has been revealed that 9 out of 10 type -2 diabetes could be prevented if some risk factors were eliminated, these include – over weight, unhealthy diet, smoking and physical inactivity. He remarked that, it is not lack of exercise that predispose people to diabetes but the amount of time spent sitting can increase the risk of type – 2 diabetes. In February 2013, the international journal of behavioural nutrition and physical activity conducted a survey of 63048 middle aged Australian men about their average sitting time per day and diagnosis of any related chronic disease including type-2 diabetes. The responses varied from 4 – 8 hours of sitting time per day [19].

The researchers discovered that increased sitting time exposed the respondents to type-2 diabetes [20]. Women are not left out as 90% of type-2 diabetes in women is associated with overweight, unhealthy diet and physical inactivity which are resultant effects of sedentary behaviour. Type-2 diabetes also affect children but are common in adults aged 30 and above. The influence of diet and exercise on the ailment cannot be overemphasized. The disease is associated with serious cardio vascular, neurological and renal complications if not properly controlled. Obesity, unhealthy diet, physical inactivity, high blood pressures are some factors that increase the risk of developing type-2 Diabetes [17,2].

Sedentary Lifestyle and Vitamin Deficiencies

Sedentary life style is associated with vitamin deficiencies especially vitamin B and D which can lead to other health conditions like Osteoarthritis. The displacement from natural outdoor environment to an indoor sedentary lifestyle and avoidance of ultraviolet ray of the sun as a means of checking cancer has resulted in high

incidence of vitamin D deficiency which in turn leads to various bone diseases and organ malfunctions such as osteoarthritis, hypertension, heart failure and other vascular diseases [21].

Nutritional transition from our traditional plant based diets are increasingly being replaced by sugary and animal fats which are low in vitamins and higher in cholesterol thereby favouring many chronic ailments. This is made worse by the general trend towards a more sedentary lifestyle. Vitamin D deficiency causes vitamin B group of vitamins (especially B6 and B12) are very important for healthful living [7].

Sedentary Lifestyle and Hyper Cholesterolemia

This is a disorder associated with elevated levels of cholesterol or lipids in the blood stream. It is also called hyper lipidemia. Cholesterol is one of the three major classes of lipids manufactured by the liver and transported to the body cells by low Density lipoproteins (LDL) and utilized for the formation of steroid hormones, bile acids and vitamin D. [22]. Cholesterol is useful to the body but it does not need to be part of our diets because the liver produces the amount needed by the body. [17] hyper cholesterol causes 18% of global cerebro vascular disease and 56% of Ischaemic heart disease [17]. It is worthy to note that where as low of level of density lipoprotein causes health complications as outlined above, high density lipoproteins are useful for maintenance of a healthy heart. It contains only 20% of cholesterol while low density lipoprotein contains 45% of cholesterol and so not good for the heart.

Table 1.1 Showing Cholesterol Levels and their Interpretations

TYPE	mg/dl	mmol/l	INTERPRETATION
1. Total cholesterol	< 200 200 – 239 > 240	< 5.2 5.2 – 6.2 > 6.2	Desirable level Borderline high level
2. Low Density Lipoprotein Cholesterol	< 100 100 – 129 130 – 159 160 – 189 > 190	< 2.6 2.6 – 3.3 3.4 – 4.1 4.1 – 4.9 > 4.9	Most desirable Good borderline high undesirable very high
3. High Density Lipoprotein Cholesterol	< 40 41 – 59 > 60	< 1.0 1.0 – 1.5 > 1.55	Undesirable optimal level good

Source: Hopkins Heart Institute – www.hopkinsmedecue.org>home>heart modified 30/9/14

WHO recommended a change from sedentary life style to increased physical activity as one of the key issues in reduction of risks to hyper cholesterolemia [16]. Other interventions include maintaining healthy weight and healthy diet especially essential fatty acids found in plants.

Sedentary Lifestyle and Muscle/Skin Changes

A sedentary lifestyle being a type of lifestyle with little or no regular physical activity is associated with some muscular and skin changes. Muscles require regular exercise to be strong and inactivity reduces muscle capacity and strength. Sitting for a long period alters the body posture.

Muscle deterioration is accelerated by inactivity and those who sit for over 5 hours daily are at risk of loosing muscle strength by 1% daily [23]. With prolonged sitting, one begins to loose the muscle fibres that are responsible for active movements. The speed of transmission of impulses from the brain to the muscles also slows down. If muscles are not used, the fibres becomes gradually replaced with fat and muscle wasting eventually occur. This leads to frequent fatigue on little exertion. Some skin problems are associated with sedentary lifestyle to include-change in skin color, fat deposits around the eye folds, eczema, body odour and itching among others. These are associated with poor excretory process related to inactivity [24].

Sedentary Lifestyle and Cardiovascular Impact

The cardiovascular system is the part of the body that contains the heart, arteries and veins. It is responsible for pumping blood through out the body thereby providing a rapid-transport system to distribute oxygen to the body cells and also remove carbondioxide from the body with other waste products. The cardiovascular system consists of the heart and blood vessels. By the process of contraction and relaxation, the heart muscle pumps blood throughout the body within 20 seconds when the body is at rest [2] cardiovascular disease as one caused by unhealthy lifestyle including smoking, poor diet and sedentary behaviour [17].

A study conducted on time spent on two sedentary behaviours – riding in cars and TV viewing per week and their relationship with cardiovascular disease morbidity [23]. The study was carried out on 7,744 men between the ages of 20-89 years. Results showed that 82% of respondents reported more than 10 hours per week of riding in a car and 23 hours per week of watching TV. 64% showed greater risk of cardiovascular impairment. The study identified physical inactivity as a major public health problem and a second leading cause of death due to cardiovascular impairment.

On the average, adults spend 170 minutes per day on TV watching which amounts to 8.6% of daily total energy expenditure, 10.9% of daily energy is spent on driving and 55-57% of total daily energy on other sedentary behaviours like computer operation, video games, reading of books or sleeping. These activities do not enhance muscular/vigorous activities and so favour cardio-vascular diseases such as Ischemic heart disease, coronary artery disease, stroke among others. Cardiovascular diseases have behavioural correlates and that physical inactivity is related to cardiovascular disease (CVD) [2,25].

Metabolic diseases which result from inactivity further expose individuals to cardiovascular impairment. Physical inactivity, unhealthy diet and obesity associated with sedentary lifestyle are health risks for cardiovascular disease which are now on the increase in developing countries creating a double burden to these countries already suffering from the effects of infectious diseases [17].

Sedentary Lifestyle and Cancer

There is a great risk for cancers of the breast and colon cancer due to sedentary lifestyle. This is because an inactive body tissues muscle and cells can trigger the development of cancerous cells which has high morbidity and mortality rates. WHO correlated prolonged sitting time and increased risk of color cancer in men and women and endometrial cancer in women [26]. Up to 7 hours per day sitting had an increased risk of endometrial cancer compared to those who sit less than 3 hours per day. Women who do not engage in vigorous physical activity have a high risk for breast cancer than active women [27]. On the other hand, inactive men also have elevated risk for prostate cancer compared to their counterparts who engage in regular physical activity. The reason for this could be traced to the fact that physical activity increases the production of testosterone, a hormone which contributes to increased risk for prostate cancer when it is excessively produced [28].

II. Conclusion

Sedentary lifestyle and behavioural factors have been implicated for various health risks identified in this seminar paper. Understanding the relationship between sedentary behaviour and health outcome and modifying these behaviours are fundamental in reducing the morbidity and mortality rates caused by these health complications. Since sedentary lifestyle predisposes individual (both old and young) to various non-communicable but devastating diseases, it is feasible to induce people to shift some proportion of their sedentary time into large volumes of light to moderate energy investing physical activities.

III. Suggestions

Based on the emerging evidences revealed by this paper on the health risks associated with sedentary life style; the following suggestions are made:

1. Work places, schools, business centres should be structured in a way that allow individuals to have adequate time for movement and recreational activities.
2. The four key health behaviours are encouraged (involving in physical activity, avoiding smoking, reducing alcohol intake and eating healthy).
3. Individuals are encouraged to reverse from present day sugary, fatty and animal based diet to our traditional plant/vegetable based diet to reduce the health risks associated with high cholesterol diet.
4. Parents are encouraged to monitor and regulate the good intake of their children as well as time spent watching TV, video and computer game to reduce obesity with its associated health risks.
5. Proper information should be disseminated on the dangers of sedentary lifestyle through all available media of communication.
6. More studies should be carried out on this topic to properly confirm the exact tolerable sedentary time that individuals can engage in without any adverse effect on their health especially the non-discretionary ones like work, school and commuting in cars.

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