

"Nintendo-isation": Sedentary Lifestyles, Obesity and Increasing Health Problems Including Type 2 Diabetes in Modern Day Children and Adolescents

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INTRODUCTION

Video games are not what they used to be. The legendary yellow disc known as Pac-man once brought hours of entertainment to children with only four simple joystick commands. Today, this game has been lost into oblivion. In its place is a new age of gaming consoles such as the XBOX or Nintendo, complete with an additional ten buttons and vibrating controller pads for the added effects of modern-day gaming. Some PC computer games are even more advanced and, with over a hundred keys on the keyboard, it is possible for each key to command a specific function. Hence an impressive combination of coordination and multi-tasking is a prerequisite to playing many online games these days. However, while computer games continue to bring entertainment to children all over the world, they have also begun to destroy their lives. As games become more enjoyable and more realistic, children are also spending longer times on their game consoles. Are the children of today seriously at risk of becoming obese at a young age and dooming themselves to the difficult task of overcoming a serious illness?

THE NEED FOR CHILDHOOD PHYSICAL ACTIVITY

There was a time when these game-playing children were unpopular among their peers and depicted as being obese computer geeks that ate unhealthy snacks while playing video games all day. The popular boys, on the other hand, would be the ones playing basketball or rugby outdoors. Today, it seems that the computer geek stereotype is no longer as disfiguring and the child with the newest Nintendo game is quite often seen as the coolest kid on the block. This move from the original healthy sporty child and adolescent to the modern day sedentary child in front of a flickering screen has become one of the major health problems of the 21st century.

It is well documented that physical activity in general boosts longevity and protects against many chronic diseases including cardiovascular disease, colon cancer, and diabetes. For proper growth and development, it is necessary to have substantial childhood physical

activity. A moderate to high level of childhood fitness reduces risk profiles in subsequent adult diseases such as prostate cancer, breast cancer, depression and gallbladder disease. The prevalence of sedentary habits and low levels of daily exercise is increasing in children in many countries. This inactivity can result in obesity of the child, and while cardiovascular disease and diabetes are not typically common in the child, we are seeing an increase in coronary heart disease risk factors and an increasing prevalence of type 2 diabetes which is of major concern. To illustrate this further, the *Irish Independent* newspaper recently reported a case of a thirteen year old child treated for deep vein thrombosis (DVT) after sitting on his legs for over ten hours playing computer games without moving. DVTs are extremely rare in children that age but in the last five years cases of DVT among the under-fifteens have risen sharply signaling a need to address this as yet rare, but growing phenomenon.¹

SEDENTARY LIFESTYLES AND OBESITY WORLDWIDE

The U.S. Department of Agriculture claims that the incidence of diabetes linked to obesity has increased significantly in children in the past few decades, particularly in type 2 diabetes.² This is a type of diabetes usually found in adults, but a sharp rise has recently been observed in children.^{3,4} Several reports from the Bogalusa Heart Study found that overweight children tended to have higher than normal blood glucose, blood pressure, and blood lipid levels, all of which increase the risks of health problems and are related to obesity and diabetes.^{2,5,6,7} It was shown that fewer than half of U.S. school children participate in daily physical exercise and they spend a lot of time playing video games.⁸ A Canadian epidemiological study examined the relationships between physical activity, sedentary behaviour (television and computer games) and body mass index (BMI) in 7216 children aged 7-11 years of age. This study showed that television viewing and video game playing increase the risk of being overweight by 17- 44% and obesity by 10- 61% in children.⁹

On the other side of the world, the

Australians carried out a similar study on 2862 children aged 5-13 years. The study found that the odds of obesity generally increased with increased television viewing, although there was no significant link with computer games in that age group.¹⁰ In Singapore, type 2 diabetes in children is an emerging problem and a reported 12% of Singaporean schoolchildren are obese, owing to increasingly sedentary lifestyles.¹¹ The Japanese also conducted a survey in nine Japanese cities and discovered that children classified as 'obese' had used video games for longer periods than children classified as 'moderate' or 'lean'.¹² A separate American study in China found that the prevalence of sedentary lifestyle did not differ between overweight and normal children, but the amount of inactivity was only an hour or less a day on average.²⁷ Snacking is also inconsequential in China, comprising only 0.9% of daily intake compared to U.S. children and Chinese children were also shown to be more active overall. As a result, Chinese children were also less overweight than American children indicating the possible value of limiting sedentary habits in other countries.²⁷

Within Ireland, a study was conducted by the Trinity College School of Physiotherapy. It investigated physical activity in Dublin children aged seven to nine years of age. The results showed that only 39% of children participate in vigorous exercise for at least twenty minutes three times or more a week, of which there were fewer girls (28%) than boys (53%). A further 57% of children were engaging in at least twenty minutes of light exercise three times or more a week. Most of the children (78%) were spending one to three hours per day sedentary in front of a screen.¹³ A 1991 study in Northern Ireland claimed that Northern Ireland had the highest incidence of coronary heart disease in the world. A study of 3211 Northern Irish children from ages 11 to 18 showed an appreciable decline in physical activity levels after the age of 14 years old, reaching extremely low levels in older girls. While 75% of the exercise taken was unrelated to school, physical education classes constituted the only form of exercise taken by one third of pupils. The report found a preponderance of children with a higher BMI than normal in the general child population.¹⁴

These are a few selected studies from around the world. Sedentary lifestyles and obesity have been linked in many other countries and several other studies and publications are available. While facts and statistics differ across different continents and cultures, the results invariably point toward the same direction, that the increase in sedentary lifestyle in childhood is

related to the increased levels of obesity, cardiovascular disease risks and diabetes. This raises serious cause for concern regarding the future health of many children.

OTHER ADVERSE EFFECTS OF NINTENDO-ISATION

Other medical side effects of computer games have been reported including photosensitive epilepsy, head and eye strains, auditory hallucinations, enuresis, encoparesis, wrist pain, neck pain and repetitive strain injuries in children and adolescents who play games excessively. Indeed some of these effects are so common that the injuries obtained as a result of these games have been given their own description, such as 'joystick digit' or 'mouse elbow'. Central palmar blisters, which occur following the rotation of the central joystick of a Nintendo game in the palm of the hand, have also been described. A form of 'overuse-injury' in relation to games using more modern game controllers occurs with the Nintendo Rumble Board™. This is a game controller that adds a sense of reality to many games including driving games where collisions of the car are accompanied by vigorous vibration of the game controllers. Increasing numbers of children were developing Hand-Arm Vibration syndrome or Vibration White Finger as it was previously known, a condition described in association with pneumatic tools and gas powered chainsaws.¹⁵ The popularity of these games has led to increased locomotor problems of the hand including a form of tendonitis aptly termed 'Nintendinitis'.¹⁶ This is caused by repetitive microtrauma to tissues due to the overuse of video games. The basic ability of tissue to repair itself is outpaced by the repetition of the insult, the healing process is inhibited and the injury is thus perpetuated.¹⁷ Other names given to these game-derived conditions include 'Nintendo Elbow',¹⁸ 'Nintendo Neck',¹⁹ 'Nintendo Enuresis',²⁰ 'Nintendo Power'²¹ and 'Nintendo Epilepsy'.²² While these names may appear quite amusing, the reality is that Nintendo-isation is plaguing the health of children and its addictive nature prevents a child from easily reducing the amount of time spent using these machines. This addictive behaviour has been shown to be similar to substance dependence in a study of 223 Spanish children aged thirteen to eighteen. A specially designed DSM-IV criteria for game-addiction was created using the DSM-IV criteria for substance dependence and pathological gambling and given to the children to complete. The results confirmed that the excessive use of video games was associated with a number of problems resembling a dependence syndrome.²³

Psychologically, the adverse outcomes of excessive gameplay often present as depression or violent behaviour. An overview of the effects of computer games on a child's cognitive and social development showed that from a cognitive point of view, video games can be considered an important building block to computer literacy. They enhance a child's ability to read, visualise images in a three-dimensional space and track multiple images simultaneously. However, in terms of social development, it was found that excessive use of the internet and video games is linked to depression and loneliness in the child. Playing violent games also increases aggressiveness and desensitises the child to suffering. It was speculated that such computer games, if played excessively, could actually diminish a child's ability to distinguish real life from simulation.²⁴

COMPUTER GAMES CAN BE BENEFICIAL

However, not all computer games are problematic to health. Well-designed, educational video games can be effective interventions for various diseases. For example *Packy and Marlon™* is an interactive video game designed to improve self-care among children and adolescents with diabetes. The players take the role of animated characters who manage their diabetes by monitoring their glucose, taking insulin injections and choosing foods while attempting to save a diabetes summer camp from marauding rats and mice that have stolen the diabetic supplies. The video game was shown to improve diabetes self-care and led to fewer unscheduled urgent doctor visits by the children.²⁵ Some virtual reality and adaptable PC games are also employed in the departments of psychiatry and psychology. They are used in cognitive behavioural therapy for patients suffering from anxiety and panic disorders. The games expose the patient to phobogenic stimuli (as part of exposure therapy) to systematically desensitize or sometimes flood the patient with phobogenic situations to induce anxiety in a therapeutic virtual environment.²⁶ Other video games are used in therapy for the rehabilitation of patients following a stroke, burns or even to reduce pain in children undergoing chemotherapy.

DO WE FAIL TO ENCOURAGE CHILDREN TO EXERCISE ENOUGH?

Unfortunately, the habits that accompany a child's sedentary behaviour are usually equally debilitating to health. This lifestyle typically consists of greasy fast food, frequent snacking and soft drinks, all of which contribute to obesity and other negative health consequences. As modern

technology becomes more advanced and societies become more affluent, children and adolescents also become more sophisticated and more engaged in modern day activities involving computers, the internet and games instead of participating in physical activity as a part of their daily life.

As a general guideline, children require at least an hour of moderate intensity physical activity a day just to maintain health. In the past, this was easily achieved in simple childhood games such as 'tag' or skipping with other children, but nowadays increasing numbers of children are returning home from school to sit in front of the television or computer for hours before dinner is served. In adolescence, the general health guideline recommends even more vigorous activity and strenuous sport for at least 20 minutes for 3 sessions per week. Physical and social environments are strong contributors to sedentary habits and it is important to change these environments in order to enable and encourage physical activity in children. The settings in which these changes can be implemented include schools, urban and transportation infrastructure, at home and in recreation clubs. While the benefits of exercise in adults are publicized by large public events such as the Dublin Women's Mini Marathon and the Dublin Marathon, little has been said about health and exercise in children.

It would be inappropriate at this stage to display warning labels on Playstation and Nintendo sets or flashing warning banners below television programmes advising users of the inherent dangers of watching too much television or playing games for too long. There is, however, a need for awareness in the general public of the potential harm of the activities. Schools may need to enforce regulations with regard to physical exercise; so that as much as possible of a student's required weekly level of activity takes place within the school grounds. It is also important to educate the students on the importance of exercise and its benefits and to encourage sports and recreation so as to develop and cultivate these interests in students. Advising children on correct postures and avoidance of long hours of video game play in public computer game arenas ('LAN-shops') and game stores will contribute to limiting morbidity associated with prolonged inactivity. Sports and recreational clubs should also provide education on the importance of exercise and the outcome of sedentary lifestyles of children. Other activities should also be promoted, such as physical exercise, walks, family and community activities as well as a proper diet of grains, fruits, vegetables, low fat meat and dairy products. Lastly, general advice on exercise,

lifestyle and diet would help to bring a general awareness to the public. In the future, campaigns about diabetes education and awareness in children should be considered as well as a public screening service for diabetes and cardiovascular disease in obese children as a prophylactic measure.

CONCLUSION

Nintendo's loveable Dr. Mario™ may be good at shooting virtual microbes with penicillin capsules but in terms of "Nintendo-isation" in the 21st century he is only another pathogen. Nintendo-isation is increasing worldwide, and has been linked with inactivity in children and

adolescents in the 21st century. This sedentary lifestyle in turn has been associated with childhood obesity and is responsible for the emergence of specific obesity-linked medical conditions in children, including type 2 diabetes and cardiovascular disease. In order to curb the progression of these undesirable health outcomes, it is important to limit sedentary habits, and to promote healthier alternatives including sport, recreation, and well balanced diets. Awareness of childhood inactivity and its outcomes are lacking in the general public and changes in educational, recreational, public and domestic settings are needed in order to address and rectify the problem.

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