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Expert in Team Work (Childhood Village)

Project report

Childhood obesity on increase; attitudes toward physical activities among children

By: The golden age group (Furqan, Fridah, Tadiwos, Tina Louise, Berit and Christina)

Supervisor: Firouz Gaini

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Key definitions

Obesity: abnormal or excessive fat accumulation with a body mass index (BMI) greater than or equal to 30

Overweight: abnormal or excessive fat accumulation with a body mass index (BMI) greater than or equal to 25

1. Introduction
    1.1. Background

Obesity, excess accumulation of fat, is becoming a major global as well as national (Norway) issue not only among adults but also among children escalating the concern about children's health and well-being (Flegal *et al*., 2006). Childhood obesity is more difficult to define as children are constantly changing weight due to normal growth and development. Thus, the assessing healthy weight requires comparing the BMI of a child with the BMI of other children of the same age, gender, ethnic origin and social class (Flegal *et al*., 2006; Aycan, 2009). Conventionally, childhood obesity is defined as the 95th percentile or greater of BMI for age (CDC, 2010).

Obesity is an increasing health problem worldwide, and in our study we are focusing on children. Looking at Europe, the Scandinavian countries have a lower prevalence of obesity compared to the Mediterranean countries, but the prevalence is on the increase also here (Dehghan *et al*., 2005). A study carried out at the University of Bergen (2010), concluded that 14% of Norwegian children between the ages of 2 and 19 were obese (Juliusson *et al*., 2010).

Obesity has many medical and non-medical adverse consequences, both at the individual level as well as in the society as a whole. The medical consequences of childhood obesity include cardiovascular complications, metabolic disorders, pulmonary complications, gastrointestinal disorders, and skeletal abnormalities. It is also linked to psychosocial problems such as depression, poor body image, and low self-esteem and confidence (Daniels, 2006; Lee, 2009). Obesity also affects the whole society as it increases the economical expenditures for obesity related medical treatments, and hence the expenditures of the society in general (Finkelstein *et al*., 2005; Covic *et al*., 2007).

There are many factors causing obesity, including lifestyle choices such as diet, cultural environment, behavioral and social factors, level of physical activity etc. There can also be genetic causes of obesity, though this is rare (Ebbeling *et al*., 2002; Dehghan *et al*., 2005).

Various studies across Europe have shown that physical activity greatly reduces the incidence of obesity. Other studies have shown that several individual factors, including attitude, affect children's participation in physical activity (Cavill *et al*., 2006). In social studies of children, they are seen as active participants in society, and children should be viewed as competent individuals able to make decisions about their own life when they are given the necessary information. This is called agency (Ibid, 113).

1.2. Why "Children's attitudes towards physical activities?"

The trend around the globe is that obesity among children is increasing, and Norway is no exception. There are different reasons for this, related to especially diet and level of physical activity. We wanted to check out the children's relation to physical activity. Does the increase in childhood obesity mean children are less physically active? Or are they becoming obese because they are less physically active? Or do they/do they not like to participate in physical activity? Or do they want do to more physical activity but they are not able to? Are children spending so much time on the computer? These curiosities and the fact that the trend of childhood obesity is escalating prompted us to think of and assess children's attitudes towards physical activities by asking them about their reasons for being or not being in physical activity. Assessing the attitude is critical as we can rule out the real motives of children's towards physical activity.

1.3. Significance of the project

The result of this project can provide information about the children's attitude towards physical activity filling the knowledge gap in this field. This is very instrumental to design new policies and strategies that increase the participation of children in physical activities at community, society, federation and country level. The study might also come up with justification for the need to consider children as competent individuals and active member of the society that necessitates the active involvement of children in decisions making, maximizing their roles in their own health and other aspects of life. The need to consider children's attitude will also be a new room to be explored by Norwegian Federation of Sport

(NIF) and by Center of Overweight and obesity St. Olav Hospital (RSSO) for effective implementation children's sport right and developing child obesity treatment and interventions, respectively.

2. Methods

2.1. Participants

Data collection of this study involved 34 children (16 boys and 18 girls) in 5th grade, all aged 10 years.

2.2. Quantitative and Qualitative research methods

Any research is essentially communication from the informants or participants (Svennevig, 2001). Selection of particular methods to use and to facilitate this communication is in influenced by a lot of different factors, one of which is time. In this study, only three/four weeks were available to both execute the research and write a report, In view of the limited time and the nature of the study on attitudes of children towards physical activity, a mixed method procedure, using both qualitative and quantitative methods within the same study was used. This could be seen as a natural emergence when mixing social sciences with human sciences (Creswell, 2003).

2.2.1. Questionnaire

To collect quantitative data, a questionnaire was used. The answers from this questionnaire provide objective data as a result from empirical measurements (Creswell, 2003). The questionnaire covered various aspects of everyday life starting with school in the morning to various activities after school, in their leisure time. This makes it easier to follow the sequence pattern enabling the children to easily recall what they are involved in. This gave opportunity for the research to get a wide perspective of children on various activities in the limited time available. However, misunderstandings can possibly arise both in conversation and in text, but mostly in the latter (Svennevig, 2001). The questions used were at level of the participants (10 years old) knowledge, and also make the content of the questions customized for achieving this goal (confused about the last part of this sentence). To ensure validity, there was need to triangulate data by use of a second instrument, the drawings.

2.2.2. Drawings

The other factor to consider in the selection of methods has to do with the target group or research participants. The United Nations Convention on the Rights of the Child (UNCRC) advocates for the rights of children to express themselves and participate in decision –making on matters that affect them (Birbeck and Drummond, 2007). Further, Article 12 states that government nations;

> *Shall assure to the child who is capable of forming his or her own views the right to express those views freely in all matters affecting the child, the views of the child being given due weight in accordance with the age and maturity of the child (UN,1990).*

Moreover, adults who make decisions on behalf of the children should ensure that the best interest of the child is upheld, by providing the care and support that the children require. Yet, for a long time, very few children have found their voices in research due to researchers' concerns about children's competence, power of communication and cognitive abilities. This study uses participant friendly methods, "giving voice to the voiceless." Birbeck and Drummond (2007) further observed that, "if one engages children appropriately in information gathering process, there is no reason why their perceptions and thoughts should not be regarded as competent." This appropriateness implies moving from adult-centered view of children as incompetent and look at them as knowledgeable on matters that affect them. It also entails using methodologies which support their intellectual and social abilities. Thompson (2008) notes that there has been a "visual turn" in the social sciences increasing the visual research, sometimes called image – based research. One of the reasons for this is that visual sociology offers different ways to elicit the experiences, opinions and perspectives of children. One such methodology is Clark's Mosaic approach. It recognises Mallaguzzi's principle of "*The Hundred Languages of Children*" in which they can express themselves. She points out that it is,

> *a strength-based framework for viewing young children as competent, active, meaning makers and explorers of their environment. ..The Mosaic approach brings together a range of methods for listening to young children's perspectives about their lives. Observation sits alongside participatory tools. It seeks to understand how children 'see' the world in order to understand their actions. (Clark, 2005:29).*

The participatory tool used in this pilot project is affording our informants, who are 10 years old to express their activity preference by making a drawing in a task called '*My favourite*

activity' and giving a reason'. In relation to the project topic on the children's attitudes towards physical activity, such an activity treats them as experts on the subject matter and opens the way for various perspectives of children on various activities. But it still affords researchers the opportunity to gather the children's views in relation to physical activity.

The reason for their choice of activity is sort (?) and compared to their response in the questionnaire on a similar section for the sake of validity. This is particularly so because of limitations of time and other material resources to allow for triangulation through other research methods like interviews to discuss the drawings. Moreover, different methods are appropriate for different age groups. Johnson (2008) observed that younger children may be interested in drawing and playing games. Furthermore, Punch (2002) noted that using drawings as a research method can be creative fun and encourages children to be more active in the research with the added advantage of more control over their form of expression.

The visual research is also important in that the drawings communicate in a different way than words. Children are themselves interested in drawings and images, and therefore, visual research matters to researchers interested in the lives and experiences of children. Visual research methods may elicit different responses than methods which are primarily speech and written word – based. The process of producing visual data may mean more to the children than just the research and its outcome, as it is something they enjoy, are competent at, and a different way of expressing themselves (Thompson, 2008).

As the drawing was done before the questionnaire was administered, it gave the children a relaxed environment but still prepared them for the more challenging and involving task of answering the questionnaire. In combination with the drawing, it broadened the view and offers opportunity to triangulate the children's attitudes. As such, use of both qualitative and quantitative methods facilitated proper analysis of results to the question at hand. All in all, this project respected the views of the children and affords them chance to express themselves in a relaxed setting, away from the influence of authoritative parents and teachers as recommended by Birbeck and Drummond (2007):

> *Children's voices can be heard in research by understanding that children can participate in meaningful ways if the research environment is one in which they feel safe, supported and valued. The research environment must be seen through the child's eye.*

2.3. Ethical considerations

2.3.1. Informed Consent

When working with children as research participants, it is very important to remember the ethics of research. Because children are below legal age, their parents or legal guardians need to consent for them if they are to participate in research of some kind. In this research, the school was informed through both written and verbal communication, and in turn communicated to the parents through E-mails. Apart from the consent of the legal guardians, the participants were informed that they were not obliged to participate. The information sheet given to the guardians also said that the survey was completely anonymous, and it included some information about us, Expert in Team (EiT) and our project. The background for this was NSD's (Norsk samfunnsvitenskapelig database – Personvernombud for forskning) guidelines for what to include in a consent form[1].

2.3.2. Confidentiality, Privacy and Rapport

For this project no sensitive information like name, address, or other information was collected to identify the participants. The participants were assured that the information collected was purely for the study. Time limitations did not allow for establishment of a good rapport with the participants and this therefore may have influence on the validity and reliability of the findings as children may say what the researcher wants to hear (Punch, 2002).

2.4. Reciprocity

The question of 'giving back' or doing something about the situation is always a dilemma in academic research. It remains in the hands of the cooperating partners to use the information gathered to better the welfare of the children in relation to implementation of programs to promote physical activity and reduce incidences of obesity.

2.5. Power Differentials and Research Context

There are always unequal power relations between adults and children. The study attempted to minimise such influence by using participant friendly method of freestyle drawing and thus

[1] http://www.nsd.uib.no/personvern/meldeskjema [Read January 21st 2013]

reduced undue contact with the participants. Much as their teachers were not present in the room, the research context of the school however, might have influenced the children to give the 'correct' answer (Punch, 2002) as they are always used to in a school set-up, instead of their actual perspective. (but the teacher was present?)

3. Theories

3.1. Medical background of obesity

3.1.1. Definition of childhood obesity

In short obesity, represents a condition where a pathological excess of body fat is present in an individual (Aycan, 2009).

practically either BMI or body fat percentages is used to define and to track obesity (Aycan, 2009). BMI is a measure of weight-for-height calculated by dividing person's weight in kilograms by the square of his height in meters. Although it is imprecise, BMI is widely used especially in defining cutoff for adulthood obesity as it is easy and correlate sufficiently with direct measurements. Conventionally, a BMI value between 18.5-25 is normal while BMI value greater than or equal to 25 and 30 is an indication overweight and obesity, respectively (Aycan, 2009, WHO, 2012).

BMI based body weight classification is crucial as it well correlates the risk for medical complications of obese patients, which increase at BMI levels above 25. A BMI greater than 27 is associated with incidence of hypertension, hypercholesterolemia, and diabetes mellitus while a BMI less than 25 is associated with increased social and psychological complications of weight gain (Aycan, 2009). Body fat percentages measure of weight, height, and the amount of fat on different body parts to estimate body fat percentages. In general, Women with more than 32% body fat and men more than 25% body fat are considered obese (Health people library project, 2006).

Obesity is not just a problem for adults, as teenagers, adolescents, and even pre-schoolers are beginning to show signs of obesity in greater and greater numbers. This might explain why obesity is becoming a major global as well as national (Norway) issue among children, escalating the concern about children's health and well-being (Flegal *et al*., 2006).

In childhood, there is not a universal definition of obesity and overweight as children are constantly changing weight due to normal growth characterized by a sharp increase during infancy, peaking at about 9 months and decreasing thereafter until about 6 years before rising up. Thus, the assessing healthy weight requires comparing the BMI of a child with the BMI of other children of the same age, gender, ethnic origin and social class (Flegal *et al*., 2006; Aycan, 2009).

Unlike adulthood obesity that is defined based on fixed BMI values related to health risk, childhood obesity is defined using percentiles of BMI-for-age in a specified reference population as there are no clear risk-related values of BMI (Flegal *et al*., 2006). In line with Centers for Disease Control (CDC) BMI charts (table 1), in some countries childhood obesity is defined as the 95th percentile or greater of BMI for age, and those with BMI between the 85th and 94th percentiles are considered as overweight (CDC Growth Chart, 2010; Speiser *et al*., 2005).

Table1: CDC Children BMI Classification for Age Percentile [Age 2-19]

Category	Age Percentile
Underweight	≤ 5th percentile
Healthy Weight	5th to the 85th percentile
Overweight	85th to the 95th percentile
Obese	≥ 95th percentile

Alternatively, ideal weight for height percentage can be used to describe childhood obesity. Accordingly, a weights being greater than 120% and 140% of ideal weight indicate obesity and sever obesity, respectively (Mei *et al*., 2002).

3.1.2. Epidemiology of childhood obesity

Obesity is becoming a worldwide epidemic public health problem with poorly understood syndromes affecting both children and adults regardless of gender and ethnic/racial group (Aycan, 2009). United States has the highest rate of prevalence of childhood overweight and obesity as compare to other countries (National Obesity Observatory, 2010).

Among European countries, the Scandinavian countries have lower rate of childhood obesity prevalence as compare to Mediterranean countries, but it is increasing also here (Dehghan *et*

al., 2005). Approximately, 30% of Europeans countries are affected by obesity and its development is leveling off (Juliusson *et al*., 2010). Similarly, the obesity trend in children is rising (Aycan, 2009). The prevalence rate of obesity is at highest in the developed countries but it also increasing in developing countries, being highest in Middle East, Central and Eastern Europe (Dehghan *et al*., 2005).

Norwegian children's prevalence rate of overweight and obesity is similar to those reported in Northern and western European countries but lower than those reported in United States, United Kingdom and southern European countries (Aycan, 2009, Juliusson *et al*., 2010).

An epidemiological study conducted by University of Bergen (Norway) to estimate the prevalence of childhood overweight and obesity and to identify the socio-demographic risk factors involved showed that 14 % prevalence of obesity. This study also identifiedsocio-demographic factors such as age, sex, ethnic origin, family size, educational and occupational status of parents as factors that affect the prevalence (Juliusson *et al*., 2010).

3.1.3. Consequences of obesity

Since childhood obesity is a multisystem disease, a disease involving various systems, it is associated with different short-term and long-term consequences that can be categorized into medical and non-medical complications (Ebbeling *et al*., 2002; Lee, 2009).

3.1.3.1. Medical Consequences

The medical consequences of childhood obesity can be broadly classified into cardiovascular such as hypertension, atherosclerosis, dyslipidaemia, heart disease (such as left ventricular hypertrophy) and stroke), metabolic (such as insulin resistance, the metabolic syndrome and diabetes type 2), pulmonary complications (such as asthma and obstructive sleep apnea), gastrointestinal disorders (such as liver disease and gastroesophageal reflux disease), skeletal abnormalities (such as hip problem and abnormal tibia growth) and others medical complications (such as polycystic ovary syndrome, pseudotumor cerebri, gallstones, arthritis, gout and cancer) (Ebbeling *et al*., 2002; Daniels, 2006; Health people library project, 2006; Lee, 2009). These complications have been widely studied in obese adults as their development takes years to be manifested in obese children (Aycan, 2009).

Hypertension, or high blood pressure, is one of the common complications of obesity both in adults and children. Several studies showed that compared to non-obese children, obese children are at higher risk for hypertension and the risk increases across the entire range of BMI values peaking at or above the 90th percentile (Daniels, 2006; Lee, 2009). Changes in multiple physiological processes such as insulin resistance, over-activity of the sympathetic nervous system, activation of the renin-angiotensin system leading to increased renal sodium re-absorption and reduced natriuresis (excretion of sodium in the ureine), and abnormalities in vascular structure and function were suggested to be contributor of obesity-associated hypertension in children (Lee, 2009).

Childhood obesity is also associated with insulin resistance, (Daniels, 2006). Insulin resistance in turn leads to glucose intolerance, hypertension and dyslipidemia as evidenced by an increase in the prevalence of type 2 diabetes mellitus in children and adolescents with increase of childhood obesity prevalence (Lee, 2009).

It was reported that children with a BMI above the 85th percentile had an increased risk of asthma regardless of their age, sex, ethnicity, socioeconomic status, and exposure to tobacco smoke. However, it is not clear whether obesity causes asthma or the other way round. An epidemiological study found that one-third of young severely overweight patients had symptoms associated with obstructive sleep apnea and 5 percent had severe obstructive sleep apnea. Obstructive sleep apnea, an abnormal collapse of the airway during sleep, results in disrupted sleep patterns. Sleep disruption can lead to excessive daytime sleepiness, decreased physical activity and school performance, as well as increased risk of further obesity. This in turn may lead to long term adverse cardiovascular consequences, learning disabilities, and memory defects (Daniels, 2006).

Growing data from cohort studies showed that non-alcoholic fatty liver disease as a metabolic consequence of obesity and a common cause of chronic liver disease in obese children (Lee, 2009). Fat starts to deposit in the liver in response to obesity and initially the deposits are relatively innocuous. However, the deposits later lead to steatohepatitis, which can then progress to fibrosis, cirrhosis, and even to end-stage liver disease and liver failure, ultimately requiring a liver transplant. Insulin resistance, hyperlipidemia, and increased oxidative stress are implicated in the pathogenesis (Daniels, 2006).

The most common childhood obesity related skeletal abnormalities (orthopedic problems) include hip problems (slipped capital femoral epiphysis), and abnormal growth of the tibia (Tibia vara, or Blount disease). Some complications of obesity are physical, the effect of excess body weight, rather than metabolic, or the effect of increased adipose tissue (Daniels, 2006).

The most prevalent complications of obesity are psychological consequences, which involve psychological health and the ability to relate to family members and peers. These include depression, poor body image, low self-esteem and confidence, reduced health-related physical quality of life in , emotional and social aspects (Daniels, 2006; Lee, 2009). Depression is the most widely studied psychological consequence of childhood obesity. However, it is not clear whether obesity causes depression or the other way round as depression itself is often associated with abnormal patterns of eating and physical activity that could result in future obesity. obesity may also result in psychosocial problems that can produce depression (Daniel, 2009).

Childhood obesity is one of the contributors for discrimination and stigmatization of obese children in school and it might partly explain why obese children have difficulties with peer relationships and have few friends (Lee, 2009; Daniel, 2009). An important psychosocial issue for overweight children and adolescents is quality of life. This was confirmed by a study that reported a significantly lower health-related quality of life and five times risk of impaired quality of life in obese children and adolescents than their normal-weight counterparts. obese children and adolescents with obstructive sleep apnea reported even lower quality of life, maybe because of increased daytime sleepiness (Daniel, 2009).

3.1.3.2. Non-medical complications

Non-medical complications of childhood obesity equally require attention and contribute in tackling of obesity. The main non-medical complications are social consequences that result from psychological complications and economical expenditures. The former includes all those psychological factors that against obese child consequently leading to less education, lower incomes and higher poverty rates in the society. The economical expenditures encompass obesity-related medical treatments and expenditures that significantly increase the overall expenditures of society (Finkelstein *et al*., 2005; Covic *et al*., 2007; Lee, 2009).

3.1.4. Causes of obesity

Normally bodyweight is regulated by maintaining the balance between energy intake and energy expenditure. There are several factors that disrupt this balance either by increasing energy intake or reducing energy expenditure leading to obesity. Development of labor saving device as a result of advancement in technology is the principal cause of reduced energy expenditures. In addition, other factors like genetic, behavioral and social factors play a role in the pathogenesis of childhood obesity (Ebbeling *et al*., 2002; Dehghan *et al*., 2005).

Genetic factors predispose a child to an obesity-conducive environment. Deficiency in certain genes can directly or indirectly increases the risk factor for developing obesity. For instance, leptin gene is important for expression of leptin, a peptide hormone that plays a key role in maintaining of energy intake and energy expenditure balance. Any abnormality in leptin function is associated with a higher risk of childhood obesity, as it can affect appetite and metabolism (Dobson, 2003). Studies confirmed that the derangements in other genes such as hypothyroidism and growth hormone deficiency may indirectly lead to childhood obesity (Dehghan *et al*., 2005).

More importantly childhood obesity is affected by personal lifestyle choices, cultural environment, behavioral and social factors including bad eating habit, sedentary life style (lack of exercise) and family factors (Ebbeling *et al.*, 2002; Health people library project, 2006).

Natural and healthy foods are best for the human body. For healthy physiology, foods should contain proteins, carbohydrates and fats. Proteins are important for growth, building and maintaining body's organs, tissues, and muscles, and for facilitation of digestion (Health people library project, 2006). Carbohydrates rich diets, which normally provide energy, such as bread, ready-to-eat cereals, potatoes, soft drinks, cakes, and biscuits increase blood glucose level and control appetite. Frequent consumption of these foods induces hormonal cascades that stimulate hunger and cause overeating, which in turn increase risk for central adiposity, cardiovascular disease and type 2 diabetes (Ebbeling *et al*., 2002). Beverages with high glycaemic index, particularly fruit and soft drinks, are responsible for increased energy intake and excessive weight gain because incomplete compensation for calories consumed in liquid form. By contrast, milk, a low glycaemic index beverage, seems to protect overweight young adults from becoming obese (Ebbeling *et al*., 2002; Finkelstein *et al*., 2005). Fats help

growth, to insulate the body, to create some hormones, to absorb some vitamins, and to have healthy hair, skin, and hearts (Health people library project, 2006).

There is no a strong and direct relationship between prevalence of childhood obesity and fat intake though excess consumption of fats. This necessitates the consideration of other factors such as the type of fat, as saturated fats are more risky than unsaturated ones (Ebbeling *et al*., 2002; Dehghan *et al*., 2005). Despite lack of supporting evidences, increased calories consumption significantly contribute to the ascending trend of childhood obesity as it might affect satiety and food consumption (Ebbeling *et al*., 2002; Dehghan *et al*., 2005; Finkelstein *et al*., 2005). During eating more calories than the body can use up, the calories will be stored and converted into fat cells increasing risk for overweight or obesity (Health people library project, 2006).

Sedentary lifestyle or lack of physical activity is strongly associated with increased risk of childhood obesity as evidenced by epidemiological data that show increased prevalence of obesity in children with sedentary behaviors like watching television and playing computer games (Health people library project, 2006; Ebbeling *et al*., 2002; Dehghan *et al*., 2005). Watching television promotes weight gain by reducing physical activity and increasing energy intake. Increased food intake and advertisement of unhealthy foods on television are the main contributors of increased energy intake while viewing television (Ebbeling *et al*., 2002).

3.2. Physical activity

In today's technological advances, simple tasks are being mechanised and children are exposed to sedentary leisure activities before the screen, thereby increasing inactivity in a lot of them. This has led to the increase in non-communicable diseases including overweight and obesity among children. A study notes "during the last 3 decades, the prevalence of obesity has tripled among persons aged 6-19 years." (MMWR, 2011). Cavill *et al* (2006) noted that physical inactivity is estimated to account for nearly 600,000 deaths per year in Europe. The significance of physical activity on the general health of the people including children is immense. It is used as a preventive measure and slowing down the progression rate of chronic diseases. These diseases are heart disease, stroke, diabetes and obesity among others. In various studies conducted at different times across Europe, it was shown that physical activity greatly reduces the incidence of obesity and other non-communicable

diseases. Erlichman and others (2002) reported that "The alarming rise in childhood obesity and its role in promoting cardiovascular disease in adulthood noted an inverse relationship between physical activity and body fat." Many other studies indicate the same.

> *Over the past half-century scientific data have continued to accumulate indicating that being physically inactive or unfit has major negative health consequences throughout the lifespan and is an important component of a comprehensive approach to chronic disease prevention and health promotion* (Haskell *et al*., 2009).

According to WHO (2010), reporting the physical fitness and health status of children and youth, there are substantially enhanced by frequent physical activity. The role of physical activity in management of weight and obesity can therefore not be overemphasised. It is important therefore that the attitudes of the children towards physical activity are assessed especially in the current technological age, where lack of time or simply no interest at all are likely to influence these feelings.

Physical activity is defined as "any force exerted by skeletal muscles that results in energy expenditure above resting level" (Cavill *et al*, 2006:2). Such activities are basically activities that children can be engaged in such as dancing, skipping, brisk walking, jump rope, swimming, cycling, playing football and other games. Physical activity is categorised at different levels depending on the intensity and these are; low, moderate and vigorous activity. Intensity has to do with the amount of effort made by an individual in the physical activity. Low intensity means that very little energy above the resting level is expended. Moderate intensity activity is that which increases the heartbeat, makes the body warm, with one becoming slightly breathless. The third category of physical activity is the vigorous one which is mainly sweaty and leaves persons breathless (Ibid, 2006).

Measurement of physical activity encompasses type of activity, time spent on it, frequency (how often) as well as intensity (how hard) (WHO, 2010:18). Our focus for the study is the moderate form of physical activity, and the extent to which the children are involved in this. By considering their attitudes towards such physical activity, it is easy to ascertain the factors leading to the increase in childhood obesity cases. Moreover, WHO recommends that individuals must be engaged in adequate levels of physical activity throughout their lives, including children and young people who should achieve at least a total of 60 minutes of moderate-intensity physical activity in most days of the week (Ibid, 2006).

To get the full health benefits of physical activity, the children's attitudes must be taken into perspective and design approaches that maximise these benefits. In the process of carrying out these physical activities, it is important that they are conducted in a fun manner, to keep the interest of the children high. Apart from the immense physical health benefits that physical activity offers, children also acquire social skills, self-positive image and a high self-esteem as well as academic achievement and general high performance (Ibid, 2006; Haskell, 2009).

There are various levels of factors that influence the attitudes towards physical activities both in the adults and the children. These occur at individual micro and macro- levels as outlined by the European and World Health Organisation (Cavill, 2006). The macro-level factors are mainly socio-economic conditions including free-time, fear of traffic, security reasons and social status to discourage engaging in physical activities. One example can be a child avoiding walking to school when the parents own a car as it is not expected by society. At the next level is the micro- level, including urbanisation, place of residence and proximity of facilities. There are fewer manual jobs as most simple tasks like washing and climbing stairs have been replaced by washing machines and escalators respectively. As such, there is very little activity that the children are routinely involved in whether they have a positive or negative attitude towards physical activity. WHO-Europe suggested that our lives should integrate activity in our daily routines and not an option in order to embrace active living (Ibid, 2006). The last factor, and of particular interest to our study has to do with the individual. The major ones that play against involvement in physical activity are lack of time, perceived benefits, social support, personal safety and being too exhausted among others.

3.3. Childhood theories

The well-being of children is a concern for many from individual level and family to that of national governments to international institutions. One such area of concern is the children's health for now and for the future, especially with the rise in obesity. A study conducted in Canada noted:

> *A major concern regarding childhood obesity is that obese children tend to become obese adults, facing an increased risk of diabetes, heart disease, orthopaedic problems and many other chronic diseases. Increasingly, paediatricians are seeing a*

rise in incidences of childhood hyperlipidemia, hypertension and diabetes (Santrock, 2004).

Norway is no exception. Juliusson and his colleagues (2010) noted that overall obesity prevalence of primary school children in Norway is of concern. This therefore calls for effort of not only the adults, but the children themselves to be involved and take an active role and make a difference in matters that affect them. In the social studies of children, childhood is no longer seen as just an early part of the life-course, a preparation for the future, but a life that has to be lived meaningfully at the present moment. It considers children as active participants in society who are capable of influencing or shaping as well as being shaped by the occurrences around them (James, 2009). In relation to the issue of obesity, children must be viewed as competent individuals who can take charge of their own health (just like adults) when provided with the necessary information concerning their development, and physical health including lifestyles that can be adopted in order to maintain it.

Santrock (2004) defined development as the "pattern of biological, cognitive and socio-emotional changes that begin at conception and continues through the lifespan". The biological encompasses changes that occur in the size of the body, cognitive, covers the child's thinking and intelligence while the socio-emotional involves the child's relationship with other people and changes in personality. In the biological development, Santrock (2004) noted that as the children get into elementary school years, they gain greater control of their bodies, and physical action is essential to refine their developing skills. No child develops exactly in the same way as the other, hence their competence in taking an active role in matters that affect them, does not necessarily have to do with the chronological age but the social age as proposed by Clark-Kazak (2009). The social age is more realistic as the experiences of children vary widely in relation to the society they are found in. In the social age notion, "Expectations hinge around when children are seen as having achieved understanding, or competence appropriate to that situation" (2003:90). As stated in the National Framework Plan 1996, outdoor activities ("*friluftslivet"*) should be advocated among Norwegian for good overall development of the children. Writing on such practices in the Norwegian culture, Nilsen (2008), pointed out that the top agenda of the government is enhancing children and young people's opportunities to develop physically, socially and mentally through walking and playing about in, and experiencing nature.

Based on their attitudes, especially in the technological age of spending time before the 'screen' it is essential to collect information about their thoughts and feelings and how these views in a way, can be used to influence the fight against obesity and make appropriate interventions. Although outdoor activity is basically part of the daily routine of an average Norwegian child from day care through elementary school and even at home, there has been concern shown in what Nilsen terms the 'discourse of worry'. She refers to Tingstad (2003) and Buckingham & Bragg (2004) who raised concern that many (post)modern childhoods are associated with many negative influences as participants in the global child market and the growth in sedentary leisure pursuits, threatening the happy, healthy and outdoor Norwegian childhood. With such modern influences therefore, it becomes essential to hear from the children. At this point, they have enough experience and exposure to these activities and therefore have their own views which would help towards reducing the prevalence of the scourge. When children's perspectives are taken into consideration in whatever interventions have to be made, they feel valued and have a sense of ownership, and would therefore, be more committed to it. This is in line with the three P's principle of the UNCRC of 1989, which advocates for protection, provision and participation.

Children can be protected from the dangers of obesity by providing them with sufficient information. The third aspect is participation, which according to Shier (2001), based on Roger Hart's ladder of participation categorises as listening, supporting, taking the perspectives into account, involvement in decision-making and finally sharing responsibility(Don't understand this sentence). At all these levels, it is the responsibility of adults to ensure that when children are expressing their views, they must be given careful attention, be supported with different means of expression and take deliberate measures to be inclusive at the rest of the levels. When responsible adults act in such a way, they are actually upholding "the best interest of the child" a paramount principle for the UNCRC to which many nations are part, including Norway. Parties to the article should ensure that the views of the children are considered as paramount in relation to age and maturity of the child. Each level is viewed from different perspectives namely openings, opportunities and obligations. (Ibid: 110). A sound approach to be more inclusive in considering their views must be to weigh the benefits and risks involved.

The consideration of children's welfare both for now and for the future, takes into account the views they hold towards certain matters that concern them. Obesity is one such case and if

taken as a problem that has to be tackled by adults only, the children may feel that they are being imposed by the adult ideals and are likely to defy the adult authority and take things their own way. However, when viewed as active participants in matters that affect their own lives, and not passive recipients of adult ideals, they become valued members of society who perceive themselves as agents of change. In our study of gathering children's thoughts and feelings, the project recognises them as stakeholders who can make a difference in relation to the problem through their active participation. This is what is referred to as agency in the sociology of children. From the Wikipedia, **agency** refers to the capacity of individuals to act independently and to make their own free choices. But for this agency to be realized, the structural factors, including the differential power relations between adults and children, and how such factors can be enabling or constraining must be considered (? Not sure I get this sentence either). Shier notes that taking the views of the children into account does not "imply that every decision must be taken in accordance with the children's wishes or that adults are bound to implement whatever children ask for" (Ibid:113). So the views of the children cannot be implemented and met in entirety but that as decisions are made by the concerned adults, the views of the children are considered and their best interest upheld. The project also recognises the extent and limitations of the children competence and therefore used methods within the limitation of time, which were participant friendly but could still provide sufficient views on the data required.

4. Results

For simplicity and easy comparison purpose, we categorized our results into questionnaires and drawing results.

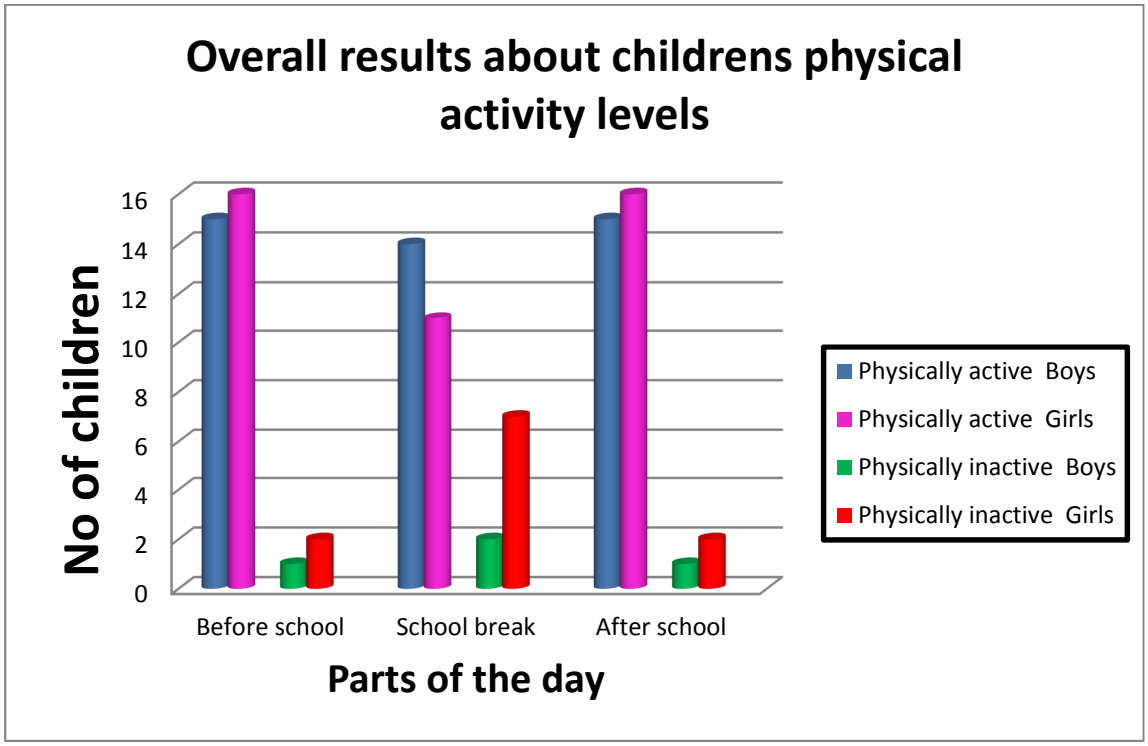
4.1. Questionnaires

In order to investigate childrens attitudes towards physical activity, we have combined some of the answers of the questionnaires and looked at them in relation to others.

4.1.1. Status of children in term of physical activity

Figure 1 gives an overview of how many children are physically active or inactive during different parts of the day, based on how they get to school and the activity they involved in during the breaks at school, and what they do after school.

Figure 1: The overall status of children's activity level during the day.



As summarised in Figure 1, most of our informants (31 out of 34) were physically active before school, as they walk or ride bike to get to school. Out of physically active children, 16 were girls and 15 were boys. Most of the children (25 out of which 11 girls and 14 boys) answered that they were engaged in different physical activities during the school breaks, including activities such as playing with friends, football, "Sura," "Boksen Går," "everything-game," swing, murderer, dance, running around, "Hoppetau", walk around, and basketball, which confirms their physically active status. Some children (9 out of 34), however, said that they spent the break doing activities that do not involve physical activity, such as sitting still, thinking and chatting with friends.

31 out of 34 children (16 girls and 15 boys) said they were involved in different physical activities after school. Figure 2 summarises how the children answered in terms of what kind of physical activity (organised/unorganised) they were involved in. Accordingly, most of them (26 out of which 14 girls and 12 boys) answered that they were involved in both organized and unorganized activities, two girls said that they were involved in organized activity only, and three boys were involved in unorganized activity only.

Figure 2: Number of children involved in different types of physical activity

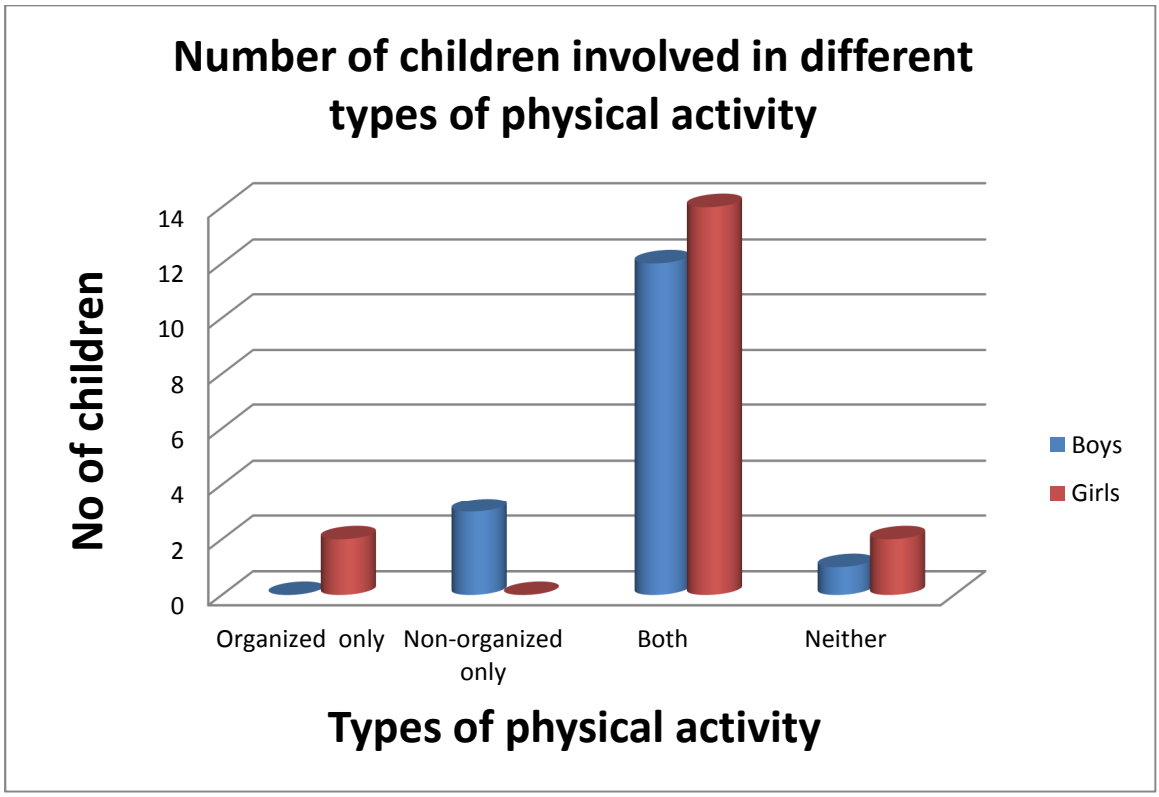
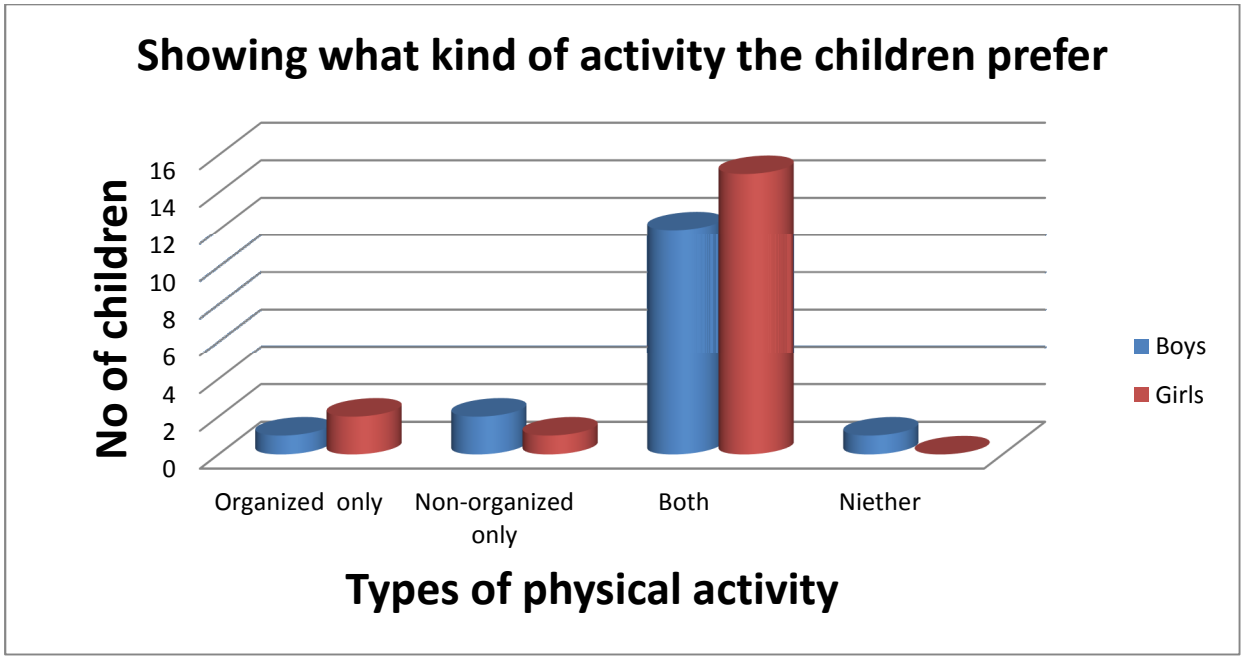


Figure 3 depicts something about children's attitude towards physical activity based on what kind of physical activity they liked the best.

Figure 3: Number of children who prefer different types of physical activity

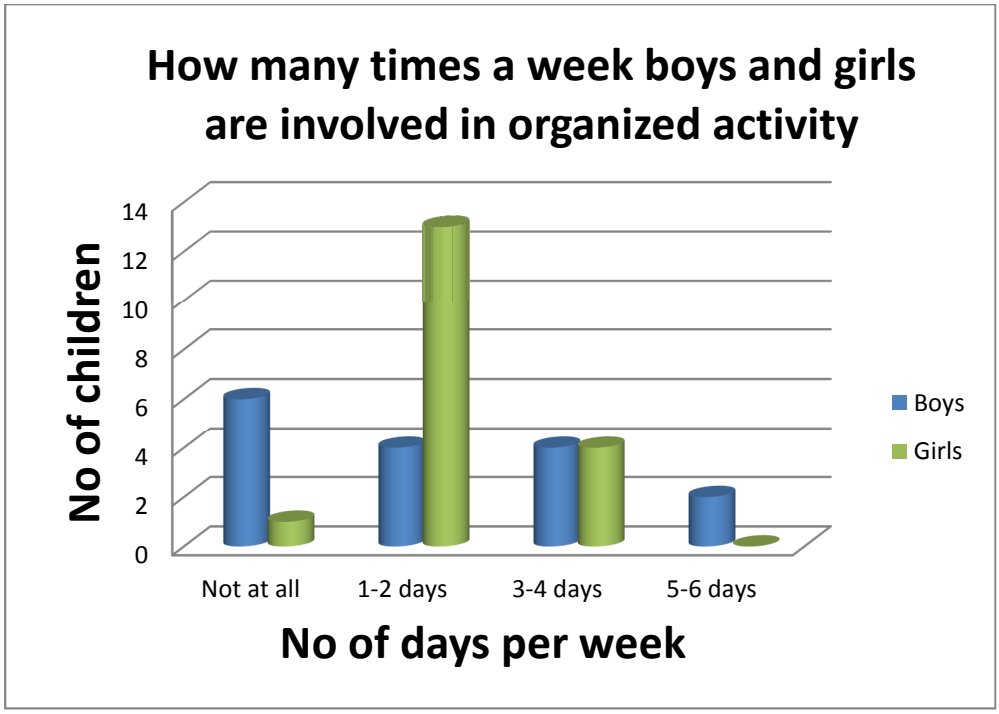


27 (14 girls and 13 boys) out of 34 children answered that they prefer to be involved in both organised and non-organised activities. Three children (2 girls and 1 boy) said that they prefer to be engaged in organized activity only. Similarly, three children (1 girl and 2 boys) said that they prefer to be engaged in unorganized activity only. Only one boy expressed that he would not like to do any physical activity at all.

4.1.2. Frequency of organized physical activity the children do a week.

Here, we asked how many times a week children were doing organised physical activity. The results are shown in figure 4.

Figure 4: Frequency of organized physical activity the children do a week

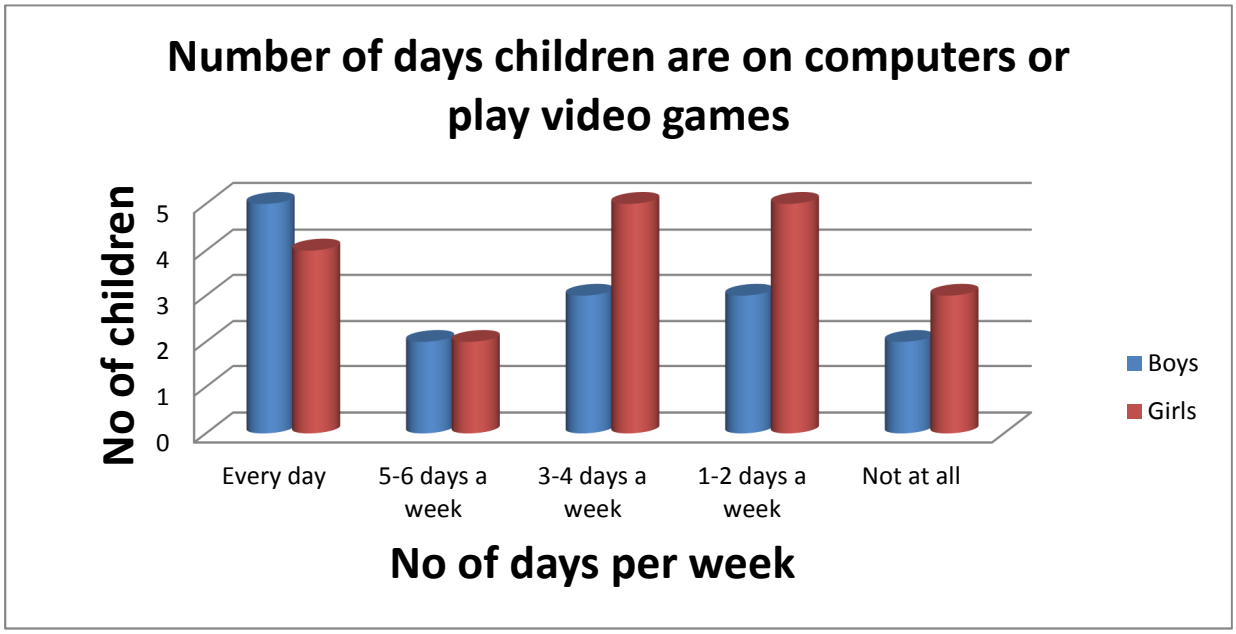


Out of the total participants 17 children (13 girls and 4 boys), 8 children (4 girls and boys) and 2 boys said that they do organized physical activities 1-2 days, 3-4 days and 5-6 days per week. The remaining 7 children (1 girl and 6 boys) picked “not at all” options for how many times they engaged in organized activity in a week.

4.1.3. Frequency of sitting in front of computer

Here we wanted to know how many days a week children are using a computer or playing videogames (such as playstation, X-box, Nintendo, etc.). The results from this question are presented in figure 4.

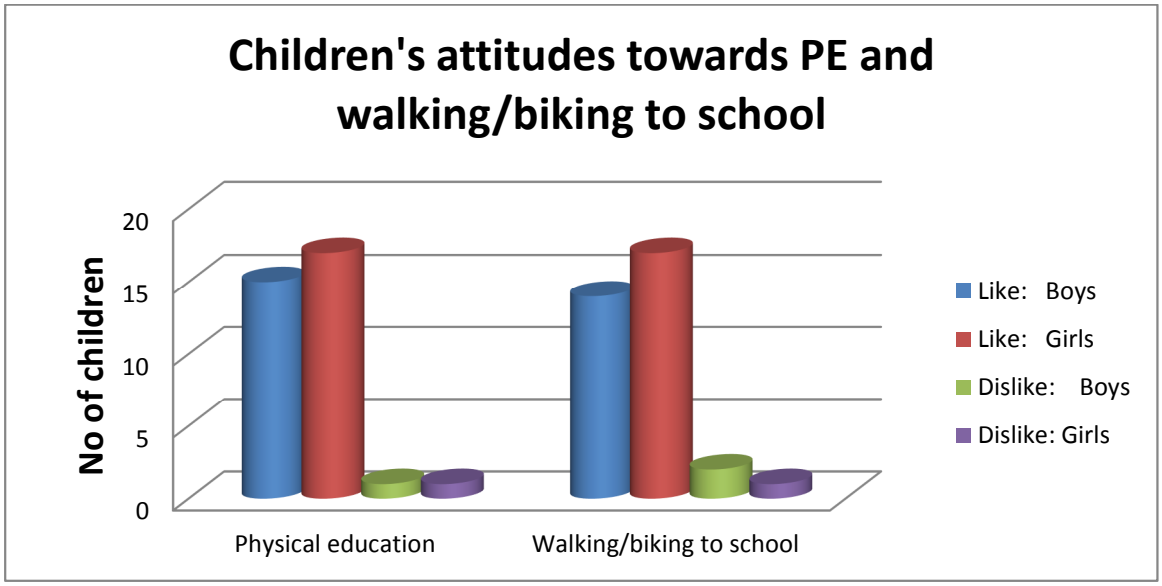
Figure 4: Showing how many days a week the students are using computers or video games.



4.1.4. Attitude towards physical activity

We also wanted to look at children's attitude towards physical education and if they would rather like to walk or bike to school. 32 out of 34 children expressed that they liked physical education and 31 out 34 said they preferred to walk or ride their bicycle to get school, rather than taking the bus. Figure 5 shows our results from these questions.

Figure 5: Shows children's attitude towards physical education and walking/biking to school.



When giving reasons for liking PE, most of the children that liked physical education stated that they like it because of things such as “it is fun”, “it involves a lot of sports”, “creates chance for them get out of class room and work out”, “makes the muscles work”, “enables

Drawing motifs	Gender

one to be more fit and stronger”, “improves body shape and makes them active”. Being quite good at physical education was also given at a reason for favouring it. Those children who did not like physical education mentioned the tiresome and exhausting nature of it as the main justification for their choices.

4.2. Drawing

The students were asked to draw a detailed drawing describing one particular activity they enjoy doing in their leisure time, physical or not.. 22 of the children drew physical activities and out of whom 14 were girls and 8 were boys.. More girls than boys chose football as their motif. On the other hand, no boys chose to draw a handball motif. While two girls did choose riding and dancing motifs, two boys chose skiing and taekwondo. On the other hand, 12 out of 34 children preferred to draw other activities that do not involve physical activities such as computer games (5 children), music lessons (5 children) and other motifs such as objects (2 children). The results of the drawings are summarized in table 2.

Table 2: The activities that the fifth grade students prefer to do during their leisure time

		Boys	Girls	Summary
Physical activities	Football	3	5	8
	Handball	0	5	5
	Riding	0	2	2
	Dancing	0	1	1
	Skiing	1	0	1
	Tae –kwon -do	1	0	1
	Other physical activity (playing outside related)	3	1	4
Other activities	Music lessons, choir, band	2	3	5
	Computer games	5	0	5
	Other motifs (book, picnic)	1	1	2
Summary		16	18	34

Discussion

The current rise in cases of obesity among children can be aided by designing appropriate and effective interventions that involve the children themselves.

> To promote physical activity as a strategy for control of weight gain and the treatment of obesity in children and adolescents, a better understanding of factors that influence participation in physical activity in youngsters and particularly in those already overweight or obese is important (Deforche et al., 2006).

Such an approach, as employed in this study is assessment of the children's attitudes towards physical activity and understanding of the factors that influence the particular attitudes. The assumption of the study was that the current increase in obesity cases could be influenced by a negative attitude of the children towards physical activity. Ajzen and Fishbein's (1980) emphasised that attitude towards physical activity is an important predictor of engagement in physical activity. It thrives on the basis that intention is an immediate determinant of behaviour and intention in turn is predicted from attitude (Ibid: 561). Therefore the children's positive or negative evaluation of physical activity has a bearing on the prevention of obesity, with a positive attitude likely to increase engagement in activity while a negative attitude is a

predictor of inactivity. Our study indicates that children have a positive attitude towards physical activity, increasing the likelihood of their engagement in it. This attitude therefore shows the willingness as well as competence of the children in the study to take action and make a difference in matters that affect them, in this case, obesity. Interventions can appropriately be designed that promote and enhance this attitude by providing them with the necessary information about the health and psychological benefits of physical activity.

The overall physical activity as reflected in the results section ranges from morning when children have to go to school through to evening and the activities of the children in their free time. In all the cases, the majority of the children are actually involved or indicate preference, a positive attitude, and a predictor of engagement in physical activity. Out of the 34 children in the study only 3 reported to be using the bus or car when going to school. According to Erlichman and others (2002), such purposeful walking and cycling, even if it may be of low intensity type, if done every day, can substantially increase energy expenditure, thus reducing body weight and fat, and in turn incidences of child obesity. The school breaks reflected a similar trend with most of the children (25 out of 34) involved in play that indicated some form of physical activity through such games as football, 'sura', running around and basketball among others. Most of the physical activities engaged in by the children are group games as also reflected in the drawings on the theme '*My favourite activity'*. This engagement therefore is not entirely due to the physical health benefits that children may be aware of, but also the enjoyment and emotional fulfillment that is gained from it as noted by Cavill et al, (2006) and Haskell (2009).

Apart from the immense physical health benefits that physical activity offers, children also acquire social skills, self-positive image and a high self-esteem as well as academic achievement and general high performance. Further, Deforche and others (2006) also observed that activities that are too difficult, too boring, not fun and monotonous discourage the children's participation in physical activity. They concluded that activities designed for children should be fun and enjoyable to sustain their interest. The 'fun factor' of a particular activity and its influence on attitude can also be seen from the results of this study in which the number of children involved in physical activity slightly takes a swift turn to the opposite side with 8 children reporting to be involved in physical activity while the rest (26) report to be inactive. This entails that during the holidays, when the children are away from most of their peers, their physical activity decreases, an indication that being with friends in group

games greatly influences the children's attitude and highlights the 'fun factor' that peers take away. This is supported by MMWR (2011), who noted that "positive social norms and support from friends and family encourage youth involvement in physical activity."

A positive social norm exists in the Norwegian culture where outdoor life is viewed as the 'normal' and an essential part of a happy, health childhood (Nilsen, 2008). The support from family in this study is clearly visible on the financial aspect, where most of the children in the study are involved in organised physical activity. On the other hand, the high involvement of children in unorganised activity is due to friends' influence during school days and not from parents during the holidays. So, much as the parents offer financial support for organised activity, it is important to sustain the interest of the children in physical activity by modelling it, especially during the children's holidays or free-time. In their study, Sallis et al found that parental physical activity showed a positive association with their children's physical activity (2000:972). The teachers as well should be role models in the school and not just the coaches especially that the children spend much of their time there.

Further, indications of physical activity are the responses the children give, for question on Physical Education (P.E.). Out of the 34 participants, only 2 reported to dislike it and this is further substantiated by the drawings in which the majority of them reflect a motif of physical activity as their favourite. Some of the reasons for liking P.E included having 'fun', 'chance to get out of class', 'improve shape and be more active' as well as 'working out muscles' among others. This shows that the children have expert knowledge on matters that affect them and all that has to be done is to enhance it. As an intervention for example, health education in schools and communities can integrate the expertise of the children to disseminate health information by door- to- door or street walk campaigns and afford them opportunity to practice healthy behaviour by physically being involved. In such a case, their participation according to Shier's (2001) ladder is not just at level of being listened to, but being taken as active participants capable of influence for the better on the matter of child obesity. In such a case, the children are able to exercise agency (James, 2009).

However, much as the attitudes of the children are positive, and may entail a strong physical activity preference amongst them, the findings do not correlate with the current increase of obesity cases for children. As stated earlier, to explain the increasing cases of obesity the survey expected a negative attitude towards physical activity among children, yet this was not so. One explanation for this is that "physical activity is a complex behaviour determined by

many factors" (Sallis et al, 2000) within society. One such factor is the self-reporting of involvement in physical activity by the children. In this survey, very few children reported to be inactive. This could be a case of over-reporting (Kristoffersen & Simonsen, 2012). The Norwegian culture expects one to be active and like outdoor activities. It is possible that some participants reported to be active just to be "correct" and true to the expected norm even, if they are not actually involved in physical activity. Sallis et al (2000) report that studies that use self -reporting measures usually find more physical activity than those that use objective measures (2000:963). This study is one such case.

Moreover, even those children involved in physical activity may not be reaching the recommended standard that reduces levels of obesity. "Weight gain occurs when persons expend less energy through physical activity than they consume through their diet" (MMWR, 2011:5). Due to various limitations (see below) this study was unable to measure physical activity in its entirety, especially in terms of time spent on it and its intensity. Though the children mentioned a lot of games (like handball, basketball and football) that are physical and the majority of them (22) are active at least for 1-4 days in a week, it is difficult to tell how intense the activities are. The same goes for the duration of the exercise. For example, WHO (2006:3), recommends that, a moderate –intensity physical activity should accumulate 60 minutes per day in order to offset the rise in obesity cases. It is likely that these expected standards are not being met. In other studies, similar situations of the children and young people not meeting the recommended standards are reported (Sallies et al, 2000; MMWR, 2011).

Another factor that can explain the rise in obesity cases is the competition for time between physical activity and computer games or internet. In what they call 'discourse of worry' Tingstad (2003) and Buckingham and Bragg (2004) in Nilsen (2008:45-6) fear that modern Norwegian childhoods are associated with negative influences and sedentary indoor leisure pursuits. Although the participants in the study report a positive attitude towards physical activity, they also use computers. Though the duration per day is not known, 21 participants spent time before the screen for 3 or more days in a week. Out of these 9 did so, on a daily basis. So, even though the children report to be active, it depends on the balance that they strike between time before the screen and that of physical activity. Sallis and others note;

> Although time spent watching T.V. is generally unrelated to activity levels, use of after school and weekend time for sedentary pursuits, was a consistent correlate for

> many children. This identifies sedentary behaviours as competitors for child's time and help to explain why interventions to decrease sedentary time result in activity (2000:972).

The cause for worry with 'screen time' is the indirect influence that it has on the children's health. Firstly, if too a time is spent before a screen (what does this mean?), it means less energy is being expended. This is worsened with especially snacking during viewing as large quantities of calories are taken in without realising. This therefore puts one at risk of gaining weight and eventually developing obesity.

Other contributing factors to the rise in obesity can be the physical environment in which the children are found. For example, due to urbanisation, escalators have replaced stair ways, therefore promoting an inactive lifestyle. But in order to defeat obesity, WHO advocates for active living, in which physical activity is integrated in daily routines. Since obesity has multiple causes, it is important that all are addressed with the emphasis on health diet and physical activity of moderate intensity, consistent and of the right type.

Our study also documented that girls were more physically active and had better attitudes than boys. These findings are in consistent with the Europe-WHO (2009) Fact sheet, which reported that a greater prevalence of overweight and obesity in boys than girls. However, these findings are on contrary to a study from the University of Bergen which reported that higher prevalence of obesity in Norwegian girls than boys involved in the study (Juliusson *et al*., 2010). Taken together, it appears that girls are more physically active that might be because of their positive attitudes toward physical activity as evidenced by the fact that girls spent less time in front of computer and said they more like PE and walking/biking to school than boys.

5. Limitations of the study

The main limitations of our study include limitation related to the sample size and representativeness of the sample, questionnaires, time and absence of direct measurement of obesity

Small sample size and less representative sample. In this study, 34 (10 years old) children were included that is small sample size as well as less representative influencing our data and

conclusion as inclusion of more children at different age level will be vital to come up with a strong evidence about the overall attitudes of children towards physical activity.

Questionnaire: despite the maximum care taken to simplify the questionnaires to children's level of understanding, there were some misunderstanding of some questions and confusions among children. In addition, some general questions were asked that need to be specified in order to have a clear picture about the physical activity status of the children. Moreover, the group faced a lot of difficulties in organizing and analyzing the answers from questionnaires that might be because of lack expert in statistics in the group.

Time: During data collection, we requested the children to draw whatever they want with the limited time bound that might affect their thinking or attitudes towards drawing. Thus, several drawing activities should be done to catch their real attitudes.

Lack of direct measurement of obesity: We were only looking at attitudes, and did not do any measurements that indicate the weight status of the children. We can therefore not conclude that a positive attitude leads to less obesity, or that children with negative attitudes were more obese.

6. Future perspectives

Others studies should be done on childhood obesity taking the limitations of this study into account. There is a need to educate the people by conducting health awareness programmes in schools as well as in society about how obesity develops? How it leads to other health related problems? What are its consequences?

Based on our findings we recommend that designing and implementing new policies that increase children's participation in sports should consider children's attitudes. Similarly, developing and evaluating obesity treatment and interventions (by the Center of Overweight & obesity St.Olav Hospital (RSSO)) should take the attitudes of the children into account.