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Nutrition and Physical Activity Recommendations for Preschool-Aged Children

- a flyer for parents

Thesis

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<p>The topic of this thesis was nutrition and physical activity recommendations for preschool-aged children. The thesis was commissioned by Kainuu Social and Health Care Joint Authority which administers all the social and healthcare services in the region and which aims to enhance the vitality and wellbeing in the region. According to the World Health Organization (WHO), childhood obesity is one of the most serious public health challenges of the 21st century. Childhood obesity is a global problem and its prevalence has increased at an alarming rate; in 2010 the number of overweight children under the age of five was estimated to be over 42 million. The Child Health Monitoring Development project pilot study (LATE-project), conducted in 2007-2008, raised children's overweight and obesity as a major and growing issue especially in Kainuu.</p> <p>The purpose of this thesis was to develop an informative and compact flyer about preschool-aged children's nutrition and physical activity recommendations for the children's parents. The aim of the thesis from the author's point of view was to develop competence in health-promoting physical activity, especially in the areas of exercise and health counseling and nutrition, through a product development process. The aim for the working life was to have informative tools to help in the prevention of children's overweight and obesity in Kajaani. From the KUAS point of view, the aim was to contribute both to the regional development of Kainuu and the R&D activities at the University with a productized thesis.</p> <p>During the product development process the author researched the necessary information and critically chose the most reliable and relevant data for the flyer. After determining the relevant data the information was limited considering the flyer's approachable and compact features. Overall the contents, structure, layout and design of the flyer were written enhancing the wanted features of the flyer; compact, approachable, easy to read and applicable. The outcome of this thesis was an informative flyer for kindergarten-aged children's parents in Kajaani. The flyer included information on children's nutrition and physical activity recommendations and practical tips, in a compact and applicable form to help the parents and children meet the recommendations in everyday life. The commissioner was satisfied with the content and design of the final product and stated that the flyer fulfilled its purpose.</p>	
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PREFACE

"Good nutrition – an adequate, well-balanced diet combined with regular physical activity – is a cornerstone of good health."

-WHO 2013

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1 INTRODUCTION

According to the World Health Organization (WHO), childhood obesity is one of the most serious public health challenges of the 21st century. Childhood obesity is a global problem and its prevalence has increased at an alarming rate; in 2010 the number of overweight children under the age of five is estimated to be over 42 million. (WHO 2013.)

The Child Health Monitoring Development project pilot study (LATE-project), conducted in 2007-2008, raised children's overweight and obesity as a major and growing issue especially in Kainuu. Since Kainuu Social and Health Care Joint Authority administers all the social and healthcare services in the area and states its mission to be working for the vitality and wellbeing in the area, they need all useful information and tools concerning a growing problem such as childhood obesity.

The topic of this thesis was nutrition and physical activity recommendations for preschool-aged children. The working-life organisation that commissioned the thesis was Kainuu Social and Health Care Joint Authority. It states one of its values being "belief in the future", so from that aspect a thesis considering a major problem among children is truly reasonable; children are the future, and the problems they carry during childhood tend to last in adulthood.

The purpose of this thesis was to develop an informative and compact flyer about preschool-aged children's nutrition and physical activity recommendations for the children's parents. The aim of the thesis from the author's point of view was to develop competence in health-promoting physical activity, especially in the areas of exercise and health counseling and nutrition, through a product development process. The aim for the working life was to have informative tools to help in the prevention of children's overweight and obesity in Kajaani. From the KUAS point of view, the aim was to contribute both to the regional development of Kainuu and the R&D activities at the University with a productized thesis.

2 PRESCHOOL-AGED CHILDREN

Preschool-aged children consider children aged 2-6 years. During this early childhood period children become more communicative and social and they learn to act independently (Bee & Boyd 2002). To understand the children's holistic development, there are three important aspects to observe; physical, cognitive and social development.

2.1 Physical Development

Preschool-aged children grow at a pace of about 5-8 centimeters in height and about 2,5-3 kilos in weight per year. Simultaneously the children develop their motor skills, especially their large-muscle (gross motor) skills. Also the children's small-muscle (fine motor) skills improve, but in fine motor tasks they still need a lot of assistance from the larger muscles. (Bee & Boyd 2002.)

Under school-aged children improve their psychomotor skills mainly through play (Anthony). Physical development of kindergarten-aged children's improving gross motor skills can be seen as improvements in activities like balance, walking, running and climbing. The children learn to dress up themselves and eat without assistance. The development of the children's fine motor skills can be seen as improving control of wrists, hands and fingers, which enables the children to learn such skills as drawing and cutting with scissors. The children's spatial perception also develops, where early physical activity experiences play an important role. (Anttila, Eronen, Kallio, Kanninen, Kauppinen, Paavilainen & Salo 2006.)

Due to slower growth in early childhood, the children may seem to eat less than during infancy. Thus, food aversions often develop during this period; a child may refuse to eat something that he used to prefer as an infant. Often the conflicts between young children and their parents focus on the children's eating behaviour. Nutritionists recommend that parents keep a variety of nutritious foods available and allow the children's own appetite

guide on the amount of food the child consumes. Thus, the parents should be more concerned about the child's preference for sweets and other high-calorie or high-fat foods, than about the amount of healthy food the child consumes. During this period, many children acquire eating habits that lead to either weight problems or normal weight later on. (Bee & Boyd 2002.)

2.2 Cognitive Development

During early childhood the children's cognitive development is progressing a lot. At the beginning of the period the children begin to learn how to accomplish goals and already by the age of 5 or 6 they are skilled to manipulate symbols and interpret other's thoughts, feelings and behaviour quite accurately. By the end of early childhood the children also understand that other people's behavior is based on their thoughts and beliefs. During this period also the children's language develops rapidly and especially the grammatical fluency of the language advances. (Bee & Boyd 2002.)

The cognitive development of children at this age considers also development of multiple functions such as memory, emotions and self-perception. The children learn progressively to speak with multiple words and sentences. The children's short-term and long-term memory develops and they record a variety of different experiences and skills. The emotional development of kindergarten-aged children includes development of social emotions like empathy, pride and shame. The children's self-perception develops progressively, including the development of self-esteem, self-conscience and the ideal perception of oneself. (Anttila et al. 2006.)

2.3 Social Development

The cognitive advances of 2-6-year-olds have a major impact on the personality and social development. Because a preschool-aged child can think and use symbols to communicate, his understanding of himself as well as his relations with family and peers improve. The child's social environment is widening and changing which allows the child to gain knowledge and skills from others. (Bee & Boyd 2002.)

Children aged 3-5 learn to imagine and become more independent and self-sufficient. At this age the children also learn to engage, participate, and cooperate with others, including peers. If these goals are not accomplished, the child may become fearful, socially excluded, limited in his ability to play, and negatively dependent on adults. Individuation for kindergarten aged children means developing a better understanding of who they are, as well as beginning to understand and learn more sophisticated ways to relate to others. (Anthony 2013.)

Family relationships are one of the most influential factors in early childhood development. The family relationships reflect both continuity and change, because the preschoolers are still attached to the family, but simultaneously are struggling to establish independence. Young children are still strongly attached to their parents, but the attachment behaviors become less visible when the children get older. Positive development of children is associated with authoritative parenting which combines warmth, clear rules and communication with high maturity demands. Authoritative parenting style includes a lot of control and acceptance, which means that the parents set clear limits but still respond to the child's individual needs. (Bee & Boyd 2002.)

3 HEALTH PROMOTION

The concept of health is very complex, and health can often be seen as a subjective experience; health can mean a variety of different things to different people. Health, as a concept, can be observed from different aspects; physical, mental, emotional, social, spiritual or societal health (Ewles & Simnett 1995). From a more holistic view, World Health Organization defines health as “A state of complete physical, mental and social well-being, and not merely the absence of disease” (WHO2013).

The main concept in this thesis is health promotion, defined by the World Health Organization as follows: “Health promotion is the process of enabling people to increase control over, and to improve, their health. It moves beyond a focus on individual behaviour towards a wide range of social and environmental interventions” (WHO 2013). Basically health promotion can be defined as actions aiming to raise the health status of individuals as well as communities (Ewles & Simnett 1995).

Health promotion can be viewed as a variety of different actions. These can include for example health education programmes, preventive health services, community-based work, healthy public policies and environmental health measures. (Ewles & Simnett 1995.) The National Institute for Health and Welfare (THL) states that the basis for health promotion is knowledge on the factors affecting an individual’s health; these factors include for example nutrition, physical activity, diseases and substance use. Therefore health promotion is often carried out by health guidance and education. (THL 2013.)

The onset of inadequate behaviors leading to the development of risk factors for chronic diseases is known to occur early in life. Therefore, an effective program for health promotion should focus on children and their environment as the starting point for behavior development (Penalvo et al. 2013). The connection between early life experiences and later health is increasingly clear and therefore new organizing framework for childhood health promotion is needed. One important factor in optimizing health in early childhood is building capacities of parents and communities, because these capacities are essential to build the foundations of lifelong health in early childhood (Mistry et al. 2012). For prevention of

childhood obesity, recommendations including specific eating and physical activity behaviors are likely to promote maintenance of healthy weight (Barlow 2007).

3.1 Nutrition

Nutrition is defined as the intake of food, considered in relation to the body's dietary needs. A shift in diet, towards increased intake of energy-dense foods that are high in fat and sugars but low in vitamins, minerals and other healthy micronutrients, is a fundamental cause behind childhood obesity. Poor or adequate nutrition can also lead to reduced immunity, increased susceptibility to disease, impaired physical and mental development, and reduced productivity. An unhealthy diet is a major risk factor for a range of chronic diseases and other conditions linked to obesity. General recommendations for a healthy diet include eating more fruit, vegetables, legumes, nuts and grains as well as cutting down on salt, sugar and saturated fats. Improving dietary habits is not just an individual problem, but rather a societal one; it demands a population-based, multisectoral, multi-disciplinary, and culturally relevant approach. (WHO 2013.)

Nutrition has an important effect to an individual's holistic health. A person needs to get approximately 50 different, necessary nutrients, that all have their tasks in the functions of a human body. The main task of nutrition is generally to produce energy, which the body needs to muscle work, body temperature regulation, heart functions, metabolism and maintaining the blood circulation. The body gets energy from fats, carbohydrates and partially also proteins. The renewal of body tissues is dependent of the proteins, minerals and water a person gets from the diet. For the vital body functions, a person's diet needs to provide the necessary vitamins, minerals and proteins that also influence the production of a variety of enzymes and hormones. The choice of consumed foods is a complex event where also the nutritional knowledge of a person plays an important role. (Kylliäinen & Lintnen 1998.)

An active basal metabolic rate and fast growth and development influence the nutritional needs of a child and the relative need of different nutrients is greater in children than in adults. A child's individual energy needs are affected by sex, height, weight, growth pace and

physical activity (Hasunen et. al 2004). Children need protein for growth and vital body functions, and the protein intake of a Finnish kindergarten-aged child is usually more than sufficient to meet the requirements (Hasunen et.al. 2004; Hörnell et. al. 2013). Soft fats are needed in a child's diet for energy and nutrients such as unsaturated fatty acids, many of which are vital for normal growth and development (Hasunen et. al. 2004). Dietary fibre is needed for the bowel functions in childhood as well as in adulthood. Children also need to get a sufficient amount of different vitamins and minerals from their diet; vitamin A for growth and sight, vitamin D for growth and development, calcium for the bones, iron for the blood (hemoglobin) and fluorine for healthy teeth. (Hasunen et. al. 2004.)

To design effective interventions for prevention and treatment of childhood obesity, information on the role of family dietary behaviors is needed. When the differences in consumption of fruit, berries and vegetables between normal-weight and overweight children and their parents have been studied, the results have revealed that normal-weight children and parents ate fruits, berries and vegetables more frequently than overweight children. The parents' consumption of fruits, berries and vegetables has a positive effect on the child's consumption of these; thus, parental modeling in determining the consumption of fruits, berries and vegetables in their children seems to be very important. (Vanhala et al. 2011.)

In the Finnish nutrition recommendations for the whole family (The Child, Family and Food), the recommendations are reflected as food and especially as the joy of eating and as a number of different kinds of possibilities to gain good, adequate nutrition. The Finnish nutrition recommendations for infants and young children are meant for healthy children born as normal weight. (Hasunen et al. 2004.)

For children's good nutrition, it is important to have regular meal times, balanced diet and an energy intake that is equal to the energy expenditure. Having family meals seems to affect positively the well-being of the whole family. A balanced diet is seen to include the basic elements of daily meals such as the choice of the type of milk, bread, and fat as well as the regular intake of vegetables, fruits and berries. The repeated everyday food choices influence the nutrition far more than occasional choices. (Hasunen et al. 2004.)

Children are recommended to regulate the quantity of food they eat themselves, and they should be guided to try and choose different kinds of food. They should also be encouraged to learn how to eat by themselves with no hurry, in a peaceful and safe environment. It is seen that the family's food choices, meal occasion, mealtime talk and attitudes affect the development of a child's eating habits and behavior. It is important that young children have a varied diet, which includes a lot of vegetables, fruits and berries, soft table spreads, fat-free milk, and healthy snacks. Adequate intake of nutrients, such as proteins, fats, dietary fiber, vitamins and minerals, is also highly important for the children's growth and development. (Hasunen et al. 2004.)

3.2. Physical Activity

The concept of physical activity (PA) is defined as any bodily movement produced by skeletal muscles that requires energy expenditure (WHO 2013). The Ministry of Social Affairs and Health states that the amount of children's physical activity has decreased so remarkably, that with the current activity rates children's normal physical growth and development are compromised (The Ministry of Social Affairs and Health 2005).

People who are physically active throughout life live longer than their sedentary counterparts (Bennet & Murphy 1997). Physical inactivity has been identified as the fourth leading risk factor for global mortality causing. Moderate intensity physical activity - such as walking, cycling, or participating in sports - on a regular basis has significant benefits for health. It can reduce the risk of cardiovascular diseases, diabetes, colon and breast cancer as well as depression. Moreover, adequate levels of physical activity help in weight control. (WHO 2013.)

Physical activity has a key role in energy balance and is promoted in children and adolescents as a positive, lifelong health behavior; physical activity is studied to have positive effects on children's growth and maturation, more specifically on children's motor, strength and cardiovascular fitness (Kohl & Hobbs 1998). Inadequate physical activity impairs the children's quality of life, causes health disadvantages and increases health risks. When children's daily

physical activity decreases to 0-30 minutes per day, the health risks increase strongly and the lack of physical activity impedes motor development. This can also cause learning disabilities and problem in socio-emotional development. Risk factors for exclusion from physical activity include unhealthy eating habits, sedentary lifestyle and a lack of physically active role models. (Karvinen, Rätty & Rautio 2010.)

Already under school-aged children have far too little daily physical activity. The children's physical activity habits develop as a part of the whole family's physical activity behaviors; thus, the role model from parents has a major role in children's physical activity behavior. Risk factors for children to have too little exercise include lack of support and role model from parents and other important persons, lack of family's outdoor activities, family's hurries and passive lifestyles and unnecessary rules, restrictions and prohibitions. The parents should recognize and understand their important role as the enablers or inhibitors of their children's physical activity. (Karvinen, Rätty & Rautio 2010.)

Adequate physical activity is considered to be very important for children's growth and development. Under school-aged children should be physically active at least two hours every day. Children's daily physical activity can consist of different activities during the day; actual sports, active games and household chores, for example. (Nuori Suomi ry.)

The Finnish recommendations for physical activity in early childhood describe more specifically than the overall criteria, how children's holistic growth, development, learning and wellbeing can be supported by physical activity and play. The recommendations include instructions for the amount and quality of physical activity as well as for the settings and suitable equipment for it. The recommendations for physical activity in early childhood education have the main focus on child day care, but are meant to guide all educational interaction with children under school age. (The Ministry of Social Affairs and Health 2005.)

Considering the amount of physical activity, the recommendations state that a child needs at least two hours of brisk physical activity every day. Considering the quality, children should be able to train on a daily basis their fundamental motor skills in various settings and in various ways. Children should be in an environment that encourages them to be active physical-

ly, does not have obstacles to physical activity and enables safe moving in different environments. It is recommended that the basic equipment for children's physical activity is available for them. There should be a sufficient amount of equipment and it should be easily accessible to children during all self-motivated activities. (The Ministry of Social Affairs and Health 2005.)

3.3 Parental Aspect of Health Promoting

The role of parenting both in the development of childhood overweight and in obesity prevention is all the time under discussion, but studies of child nutrition and growth are defining ways in which parents affect their children's development of food- and activity-related behaviors. Interventions aimed at the prevention of childhood overweight and obesity should include parents as important change-makers in their children's behaviors. (Lindsay, Sussner, Kim & Gortmaker 2006.)

Hesketh et. al. (2005) studied that parents believe that their children know which foods are healthy but don't comprehend the consequences of eating unhealthy foods. The parents also believed that children don't internalize the messages about eating unhealthy foods in the same way that they understand the messages of negative health effects of for example smoking. The parents stated that the inconsistent messages about unhealthy energy-dense foods and their attractive marketing and advertising strategies confuse the children. Although the parents were generally well-informed, they requested more parent education on children's healthy eating. The parents felt especially incompetent to distinguish between more and less healthy pre-packaged snacks in the huge supply that is available and marketed to children. The parents also stated that they need strategies to encourage their children to eat healthy foods and be more physically active and, as a contradiction, strategies to resist the children's demands for unhealthy foods. In addition, the parents gave recommendations regarding the timing and content of childhood obesity prevention strategies. They suggested that the prevention needs to begin before the children enter school, because the school-based prevention seems to be too late; more and more children are already overweight at the age of five.

However, school-based strategies may be helpful to achieve change over time. Evidence demonstrates that early childhood interventions can make a shift between the risk and the protective factors of overweight; thus, earlier interventions for childhood overweight and obesity can lead to the preferred outcome. (Hesketh, Waters, Green, Salmon, & Williams 2005.)

4 CHILDHOOD OVERWEIGHT AND OBESITY

According to the World Health Organization (WHO), overweight and obesity are defined as abnormal or excessive fat accumulation that may impair health. Childhood obesity is one of the most serious public health challenges of the 21st century. Globally, in 2010 the estimated number of overweight children was over 42 million, close to 35 million of these living in developing countries. It is likely that overweight and obese children stay obese into adulthood, being more likely to develop noncommunicable diseases like diabetes and cardiovascular diseases at a younger age. Since overweight, obesity and their related diseases are largely preventable, prevention of childhood obesity needs high priority. Fundamentally the growing prevalence of childhood obesity is due to a shift in diet towards an increased intake of energy-dense foods and a decrease in the levels of physical activity. (WHO 2012.)

The results of the Finnish Child Health Monitoring Development project pilot study (LATE-project 2007-2008) showed that overweight and obesity was a notable problem among small children and adolescents. The study revealed that almost 10% of pre-school aged children and children under age of 12 years were overweight, as were 26% of adolescents. The results address the importance of health education and health promotion among children and their whole families. Regarding the use of milk and bread spreads, food choices were close to the recommendations, but there were major challenges in the use of sweet food products and inadequate consumption of vegetables and fruit. (Mäki et al. 2010.)

In Finland, childhood overweight and obesity is defined by using the height-weight ratio, which means the child's weight in relation to the average weight of other children of the same sex and age, and the ratio is expressed as a percentage. For children under the age of seven, the height-weight ratio of 10-20% indicates overweight and ratio of over 20% is considered obesity (Käypä hoito 2012). Measured with the height-weight ratio, the LATE-project revealed that almost 10% of pre-school aged Finnish children were overweight (Mäki et al. 2012). Childhood overweight and obesity can also be defined by the body mass index (BMI), which is calculated by dividing weight (kg) by height² (cm). However, if childhood

obesity is defined with the BMI, specific cut off points need to be applied for the target group's age and sex (Cole, Bellizzi, Flegal & Dietz 2000).

A research 'Factors associated with parental recognition of a child's overweight status - a cross sectional study' was conducted by Vanhala et al. and it aimed to analyze the factors associated with a parent's ability to recognize their own child's overweight status. The study revealed that over a half (57%) of the parents of overweight children considered their child as normal weight. The study concluded that a child's healthy eating habits and physical activity are inversely related to parental recognition of their child's overweight; thus these factors should be considered when planning prevention and treatment strategies for childhood obesity. (Vanhala et al. 2011.)

In addition to the parents' perspective, the child's own perspective of his weight status has also been researched in a study 'Overweight Adolescents' Self-Perceived Weight and Weight Control Behaviour: HBSC Study in Finland 1994–2010'. In the research Ojala et al. investigated overweight adolescents' self-perceived weight, body dissatisfaction and weight control behavior in Finland during 1994-2010. The study revealed that 62-69% of overweight boys and 89-100% of girls evaluated themselves as too fat. Also their body image was lower than in normal-weight adolescents. The highest prevalence of weight controlling was found in males (18%) in 2006 and in females (39%) in 2010. As a conclusion the researchers stated that there was no significant difference in the self-perception or weight control behavior between the survey years. (Ojala et al. 2012.)

4.1 Causes of Childhood Overweight and Obesity

The risk for obesity is affected by an individual's genetic background as well as behavioral and environmental factors. However, the increase of childhood obesity has been too rapid to be caused by a genetic shift, but rather it results from changes in eating and physical activity habits and thus a shift in the balance of energy intake and expenditure (Barlow 2007).

It has been studied that a relatively larger consumption of certain nutrients (generally associated with weight gain), such as saturated fats and high-sugar carbohydrates, can increase the risk for excessive weight gain in childhood as well as in any stage of an individual's lifecycle. Also the energy-density of foods is seen to affect satiety and food consumption, and especially in children's diets it is associated with fats and starchy foods like cereal, bread and potatoes. Larger portion size is often linked to overweight; however, in children from the age of 3 to 6, it has been studied that a larger portion size does not generally lead to higher food intake. One of today's popular trends, fast food, is typical to have all the above mentioned unfavorable dietary factors; fast food is usually filled with saturated and trans fats, has a high glycaemic index and high energy density and is served in large portion size. Fast foods also tend to be low in fibre, micronutrients and antioxidants, and these factors suggest that the rise in fast food consumption might have a relevant impact on the rise of childhood obesity. (Ebbeling, Pawlak & Ludwig 2002.)

Combined with today's nutritional trends, an inactive lifestyle is also seen to be a possible cause of childhood obesity. Play and physical activity in childhood have decreased due to popular sedentary activities such as television viewing and video games. A child's nutrition and physical activity behavior is widely impacted by family factors; families eat out more than before while their activities are also becoming more and more sedentary. It has been researched that eating family dinners seems to decrease television viewing and improve diet quality whilst social support from parents increases participation in physical activity. (Ebbeling, Pawlak & Ludwig 2002.)

4.2 Consequences of Childhood Overweight and Obesity

Carrying excess weight in childhood can have serious consequences in later life. Childhood overweight and obesity tend to last until adulthood, increasing the risk for premature illnesses and death and therefore raising serious public health concerns (Ebbeling, Pawlak & Ludwig 2002). In addition to the consequences of obesity in later life, overweight and obesity can cause major physical and psychological health risks already in childhood (Jalanko 2012).

Obesity affects multiple important body systems and many health conditions that were earlier thought to be only adults' problems, are now increasingly present among children also. Cardiovascular problems associated with childhood obesity include high blood pressure, increased thickness of the heart's main pumping chamber (left ventricular hypertrophy) and hardening of the arteries (atherosclerosis), which are known risk factors for cardiovascular disease. Disorders of the metabolic system, that are linked with childhood obesity, include insulin resistance, the metabolic syndrome, abnormal levels of fat in the blood (dyslipidemia) and type 2 diabetes. The prevalence of pulmonary problems, such as asthma and obstructive sleep apnea (an abnormal collapse of the airway during sleep), have also increased in parallel with increasing prevalence of childhood overweight. Childhood overweight and obesity may also affect the gastrointestinal system and the skeletal system, causing for example liver disease and erosion of weight-bearing joints (osteoarthritis). (Daniels 2006.)

Psychosocial issues, involving psychological health and ability to relate to others, can also be resulting from overweight and obesity; depression, difficulties in peer relationships and impaired quality of life are conditions that may be caused by overweight and obesity (Daniels 2006). In addition to the above mentioned issues, psychological and behavioral problems associated with childhood obesity include also negative self-esteem, withdrawal from interaction with peers, anxiety and feeling of rejection (Deckelbaum & Williams 2001).

There are also economic issues related to overweight and obesity, and the most important of these is probably the costs of obesity's associated health problems. Other economic issues related to obesity include also stigmatization or negative stereotyping, which can lead to various difficulties in an individual's everyday life. Perhaps the worst consequence of childhood obesity is tracking obesity into adulthood; compared with normal-weight peers, overweight children are more likely to become overweight adults. (Daniels 2006.)

4.3 Prevention of Childhood Overweight and Obesity

The primary environmental influences on childhood obesity are increase in energy intake and decrease in physical activity. When approaching childhood obesity, there are three levels of prevention to be considered: primordial prevention aiming to maintain normal BMI across childhood; primary prevention aiming to prevent overweight children from becoming obese; and secondary prevention aiming to treat obese children to reduce comorbidities and, if possible, reverse overweight and obesity. Overall, in childhood obesity prevention, it is needed to balance energy intake with energy output and replace inactivity with physical activity. For the kindergarten-aged children, it is recommended to provide child and parent nutrition education and thus help the child in developing healthy food preferences. (Deckelbaum & Williams 2001.)

Based on a variety of evidence, Barlow (2007) recommends overweight children and their families to adopt and maintain following specific eating and activity behaviors:

1. Limiting the consumption of sugar-sweetened beverages
2. Encouraging consumption of diets with recommended quantities of fruits and vegetables
3. Limiting television and other screen time
4. Eating breakfast daily
5. Limiting eating out at restaurants, particularly fast food restaurants
6. Encouraging family meals in which parents and children eat together
7. Limiting portion size

On the basis of analysis of available data and expertise, the prevention writing group also suggests the following behaviors:

1. Eating a diet rich in calcium
2. Eating a diet high in fiber;
3. Eating a diet with balanced macronutrients (energy from fat, carbohydrates, and protein in proportions for age, as recommended by Dietary Reference Intakes)

4. Encouraging exclusive breastfeeding to 6 months of age and maintenance of breastfeeding after introduction of solid food to 12 months of age and beyond
5. Promoting moderate to vigorous physical activity for at least 60 minutes each day
6. Limiting consumption of energy-dense foods.

The commitment of parents and other caregivers to helping a child develop healthy behavior patterns is likely to be very important in obesity prevention. Parents should be encouraged to make the home environment healthy for the children and to act as role models and authority figures to influence their children's eating and activity habits. (Barlow 2007.)

Though the parents' role is changing at different stages of a child's development, the parents are major actors in prevention of childhood obesity. By understanding their own role, parents can learn to influence their children's dietary practices and physical activity behaviors potentially drastically. Parental involvement in obesity prevention can be one key to success in developing an environment that promotes healthy eating and physical activity among children. (Lindsay et. al. 2006.)

5 PRODUCT DEVELOPMENT

Nowadays, the importance of innovation and product development is growing, and therefore innovative products must be developed faster and more efficiently (Johnson & Kirchain 2011). According to the KUAS, a product development thesis aims to produce and develop something new (for example equipment, guide, event or educational session) that differs from what has been done before. The outcome of a product development thesis has to be based on critical thinking as well as on the chosen knowledge base. Practicality and familiarity of the working life have to be considered during the whole thesis process and its documentation.

Product development thesis is a process; it is work that leads to an end result, a final product (Hakala 2000). The process can be divided into three distinct phases which are inception, creation and realization. The inception phase means activities before the actual development of the product, and these activities include market research as well as research on the issue. The creation phase is the development phase where the concept of the product is defined and designed and a prototype of the product can be made. In the realization phase the product is manufactured and distributed. (Jones 1997.)

A well-designed product development process is necessary to enhance risk management, reduce development time and create better products (Unger & Eppinger 2011). In the process the student researches the theoretical background to a topic and defines key concepts and developmental tasks for the process. After the developmental tasks are set, the student writes a production plan which describes the specific content and implementation of the product. The product can then be developed in phases, where there is first a rough version of the product, which then is modified and improved, through testing and evaluating, into the final product. Also the final product is tested and evaluated, after which all possible mistakes are still corrected. The whole process is then reported, and the reliability and ethicality of the thesis are discussed. (Hakala 2000.)

6 RESEARCH TASKS

The purpose of this thesis was to develop an informative and compact flyer about pre-school-aged children's nutrition and physical activity recommendations for the children's parents. The aim of the thesis from the author's point of view was to develop competence in health-promoting physical activity, especially in the areas of exercise and health counseling and nutrition, through a product development process. The aim for the working life was to have informative tools to help in the prevention of children's overweight and obesity in Kajaani. From the KUAS point of view, the aim was to contribute both to the regional development of Kainuu and the R&D activities at the University with a productized thesis.

The research tasks of the thesis were the following:

What are the main nutrition and physical activity recommendations?

What nutritional guidelines enhance the children's normal growth and development?

What physical activity guidelines are the most beneficial for children's normal growth and development?

7 PRODUCT DEVELOPMENT PROCESS

A product development process requires many issues to be considered. Firstly, the party behind the product has to be thought; who is the sender of the message and what features of himself does the sender want to reveal for the audience? Secondly, the target group has to be explored; for whom is the product developed. After these considerations, it is needed to discuss what is the message of the product, why and how is it made and when is it delivered. (Pesonen 2007.)

7.1 Contents

The product development process was challenging and time-consuming. First the author had to research the necessary information and critically choose the most reliable and relevant data for the flyer. Eventually the hardest part was to limit the information, considering that the flyer should not be too long to lose its approachable and compact features. When the information was chosen, it was time to begin to work on the structure, layout and design of the product.

The outcome of this thesis was an informative flyer for kindergarten-aged children's parents in Kajaani. The flyer included information on children's nutrition and physical activity recommendations and practical tips, in a compact and applicable form to help the parents and children meet the recommendations in everyday life. The information was structured on the flyer so that the heading was followed by an introduction which included information about children's development, the importance of diet and physical activity as well as the parents' role in the development and behavior of the children. The purpose of the flyer was also represented in the introduction.

After the introduction there were four pages considering children's nutrition and four pages considering physical activity. Nutrition and physical activity form two sections in the flyer,

and the both sections progress with the same pattern of four titles; general recommendations, quantity (of food/physical activity), quality and environment. Each title has compact information about the subject which is followed with applicable, practical tips to improve those areas in everyday life. The structure and content of the flyer was considered to make it logical and easy to read.

The contents of the product were fundamentally chosen from the Finnish nutrition recommendations for children and the Finnish Recommendations for physical activity in early childhood education, both of which are publications of the Ministry of Social Affairs and Health. The contents of the flyer were written enhancing the wanted features of the flyer; compact, approachable, easy to read and applicable.

7.2 Design

The flyer was made by using Microsoft Office Word 2007 –program. When designing the outlook of the document, the author ended up using a ready template from Microsoft Office Online –collection. A 2-pages flyer template ‘Health Simple design’ was chosen, because it was seen to be very suitable for the contents and had the exterior look that the author considered appealing to the target group, which are the children’s parents. The two pictures in the product are from Microsoft Office Clip Art Photography collection.

The color scheme of the product consists of different shades of brown and grey. The main color is dark wooden brown, which looks very soft and warm. The color scheme of the pictures is also very earthy and therefore it suits well with the overall color scheme of the flyer. The font used in the product is Verdana and the size of the font varies font size 16 in the heading to 10 in the actual text. The color of the font varies from white text on a dark background to grey and black text on a light background. Overall the design of the product is very simple and the author considers the design the product seem easy to approach and read.

8 DISCUSSION

In this chapter the author describes the reliability and ethicality of the thesis and evaluates the product. The author also describes her professional growth during the process and presents a few points of views for the future.

8.1 Reliability and Ethicality

Reliability of a research can be described as the repeatability of research results (Hirsjärvi, Remes & Sajavaara 1997). Considering the reliability of a product development thesis, there can be used for example criteria like truthfulness, meaningfulness, consistency, quality of the theoretical background, responsibility, suitability and understandability. The evaluation of reliability concerns the whole thesis process, during which the author has to consider the credibility of the work; can it be generalized, how the authors own pre-assumptions affect the work and how the work is supported by other relative researches. (Hirsjärvi, Remes & Sajavaara 1997; Eskola & Suoranta 1998.)

In this thesis reliability was considered during the whole process. The main sources of the thesis and the product itself are publications of governmental departments and national institutes of Finland, which aims for the truthfulness of the thesis. All the sources were critically examined and evaluated. Meaningfulness of this thesis is considered from the current state of the issue; notably rising levels of childhood overweight and obesity, both globally and locally in Kainuu. The suitability and understandability of the final product was supposed to be tested, but apparently the product did not yet reach the target group. During the thesis process the author aimed to work consistently and responsibly through every phase.

Ethicality of research includes using good research practices, using sources critically and avoiding carelessness and plagiarism. The student's compliance to timetables and working

with others in the process as agreed, are also ethical matters. The student should aim for ethically justified solutions during the whole thesis process (Hirsjärvi et al. 1997).

The above mentioned factors of ethicality were constantly considered during the thesis process. However, for multiple reasons it was very hard to avoid carelessness at times, as was also the compliance to timetables. The commissioning agreement was made with the commissioner and the copyright of the product was agreed to be owned by the author.

8.2 Product Evaluation

The product development thesis process was truly a process from every aspect. During the process the final product developed from the initial idea of a printed flyer to being a hyperlink, finally resulting in a prototype model of a flyer for the commissioner's potential use later.

After writing the theoretical background for the thesis, the needed information to the flyer model was compiled. Even though the writing of the theory was challenging and time-consuming, it was then quite pleasant to compile the information in the flyer; partly because from the beginning, the author had a clear idea of what kind of information she wanted to include and partly because the idea then developed during the writing work. The author was satisfied with the final product and its contents and design.

The commissioner of the work was also satisfied with the final product. The commissioner appreciated the outlook of the product, especially the color scheme and approachable pictures. The commissioner was happy about the fact that the flyer is neither underestimating nor overestimating the target group. The commissioner thought that the flyer was informative, compact, applicable and understandable for ordinary parents, and therefore served its purpose well.

8.3. Professional Development

The whole thesis process was very challenging. However, the author was pleased to have a topic that was personally and professionally genuinely interesting. The author is planning to work with children in the future and this thesis process helped to gain a lot of knowledge on children as well as understanding of what it requires to be a good role model for them.

The thesis process developed the author's ability to evaluate and develop her professional competence and learning methods as well as the ability to retrieve and analyze information and evaluate it critically. The thesis process also educated the author to work according to the ethical principles of the subject field and to take responsibility for her own work. The process improved the author's understanding of the working life in the field of physical activity and the ability to operate in communicative and interactive situations in the working life. Also the author's skills to utilize information and communications technology in the field of physical activity improved a lot during the process. Overall the thesis process developed the author's ability to conduct research on a subject and to develop a product according to the research and the existing knowledge on the subject.

From the author's point of view, the most educating part of the whole process was the feedback received throughout the process. Constructive feedback is one of the most valuable tools when doing a work such as thesis; feedback from the supervising teacher, the commissioner and the peer supervisors gives new points of views and new opinions, and the best of all, makes the author consider her own work from new aspects. To get the best benefits from the feedback, it is crucial to understand that it is provided to help the author improve her work; understanding the importance of feedback was certainly one of the major promoters of professional development for the author of this thesis.

The author's ability for critical thinking progressed a lot during the process, having to consider the relevant and reliable information for the thesis. One major learning experience for the author was the importance of following schedules planned for the work; the author of this thesis had difficulties to follow the schedules which made the whole process even harder. One challenge of this work was also the author's lack of experience on information tech-

nology and different programs, but through the process the author developed a lot in that area.

Considering the competences in the area of physical activity, this thesis presents the author's understanding on the value of various physical activities and their importance in developing motor skills, physical qualities and self-expression. In the area of health promoting physical activity, this thesis reflects the author's knowledge of the factors affecting human growth, development, and social behavior as well as demonstrates the expertise in health enhancing physical activity. This thesis also demonstrates knowledge of the use of physical education for the benefit of supporting human growth and development. The thesis demonstrates the author's ability to manage developmental visions in physical activity culture and to improve the status of physical education in society as well as the ability to work in different expert and executive tasks in physical education.

8.4 Future Aspects

This productized thesis was one of many acts in the major health challenge of childhood overweight and obesity. It is safe to say that a flyer for parents in a small area like Kajaani will not stop the drastic increase in childhood obesity globally or even locally. Thus, there is need for larger and louder actions in the future. One step could be nationwide promotion of the issue, perhaps through newspapers and even television. The approach will also probably need to be more provocative in the future to truly get the adults awake to see the huge unhealthy problem of childhood obesity. After all, in Finland there are nationwide promotion-adverts in the television, showing starving children who are getting more and more ill because of the lack of food – so why not to show the other end also?

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Nuori Suomi ry



**PÄIVÄKOTI-ikäISEN RAVINTO JA LIIKUNTA
– VINKKEJÄ VANHEMMILLE**



JOHDANTO

Lasten ruokavalion laatu on heikentynyt yleisesti ja samalla päivittäisen liikunnan määrä on vähentynyt merkittävästi. Tämän seurauksena lasten ylipaino ja lihavuus on noussut yhdeksi 2000-luvun vakavimmista terveyshaasteista niin maailmanlaajuisesti kuin paikallisestikin.

Leikki-ikäinen lapsi tarvitsee tasapainoisen ja säännöllisen ruokavalion sekä riittävästi liikuntaa tukemaan lapsen kokonaisvaltaista kasvuja kehitystä. Leikki-ikäisen karkeamotoriikka eli suurten lihasryhmien hallinta kehittyy muun muassa tasapaino-, juoksu- ja kiipeilyleikeissä.

Leikki-ikäinen opettelee myös tulkitsemaan muita ihmisiä ja ymmärtämään omaa suhdettaan muihin, ja perhesuhteet ovatkin yksi merkittävimmistä vaikuttajista leikki-ikäisen kehityksessä. Vanhemmat ovat ratkaisevassa asemassa lapsen liikunta- ja ruokailutottumusten muodostumisessa, ja nämä lapsuudessa muodostuneet tottumukset säilyvät usein aikuisuuteen.

Hyvä ravitsemus – tasapainoinen ruokavalio yhdistettynä säännölliseen liikuntaan – on hyvän terveyden kulmakivi.

Tämän lehtisen tarkoitus on tarjota päiväkotikäisten lasten vanhemmille tietoa lasten ravitsemus- ja liikuntasuosituksista tiiviissä ja helposti sovellettavassa muodossa.



LEIKKI-ikäISEN TASAPAINOISET RUOKATOTTUMUKSET

Hyvä ruokavalio koostuu käytännössä pienistä päivittäisistä perusasioista kuten maidon, leivän ja rasvan laadun valinnasta ja kasvien säännöllisestä syömisestä. Runsaasti syötävät ruoka-aineet vaikuttavat ruokavalion kokonaisuuteen enemmän kuin vähän syödyt ruoka-aineet. Arkena ateriat höystetään kasviksilla ja ruokavalion monipuolisuus taataan päivittäisellä ja viikoittaisella vaihtelulla. Kakut, keksit, makeiset ja muut naposteltavat kuuluvat juhliin.

Säännöllistä, monipuolista, energiantarvetta vastaava määrä;

- huolehdi, että perhe syö säännöllisinä ruoka-aikoina ruokapöydässä
- tarjoa lapselle monipuolista, vaihtelevaa, ravitsevaa ruokaa
- anna lapsen säädellä ruuan määrä
- ohjaa vähitellen lasta itse valitsemaan ja maistelemaan erilaisia ruokia
- kannusta lasta syömään omatoimisesti kiireettömässä ja turvallisessa ympäristössä
- säännöllinen ruokailurytmi on kasvavalle lapselle erittäin tärkeää; lapsi pystyy syömään vain pieniä annoksia kerrallaan, ja on herkkä pitkien ruokailuvälien ja nälän aiheuttamalle väsymykselle

RUUAN MÄÄRÄ JA RUOKAILURYTMI

Leikki-ikäinen lapsi säätelee itse oman ruokamääränsä nälän ja kylläisyyden tunteiden mukaan. Syödessään terveellistä, täyspainoista ruokaa, terve lapsi säätelee ruokamääränsä energiantarvetta vastaavaksi. Tuputtaminen vain häiritsee lapsen luontaista kylläisyyden säätelyä. Jokaisella lapsella on yksilöllinen energiantarve, johon vaikuttavat lapsen sukupuoli, pituus, paino, kasvunopeus ja liikunta. Lapsen energiantarvetta voi kuitenkin arvioida alla olevalla kaavalla.

- Leikki-ikäisen laskennallinen energiantarve:

$$1000\text{kcal} + (\text{ikä vuosissa} \times 100\text{kcal})$$

- Vinkki: Jos sinua huolestuttaa lapsesi syömisen määrä, pidä kahden viikon ajan ruokapäiväkirjaa hänen syömisistään – ruokapäiväkirjasta voit tarkistaa, onko lapsesi todellisuudessa syönyt viikon aikana riittävästi

Säännöllinen ruokailurytmi on kasvavalle lapselle erittäin tärkeää; lapsi pystyy syömään vain pieniä annoksia kerrallaan, ja on herkkä pitkien ruokailuvälien ja nälän aiheuttamalle väsymykselle

- Vinkki: Usein lapsen toimiva ateriarytmi on aamupala, lounas, välipala, päivällinen ja iltapala. Jotkut lapset kuitenkin saattavat tarvita ylimääräisen välipalan aamu- tai iltapäivälle.

RUUAN LAATU

Lapsen pääaterian kokoaminen:

1. Kasviksia – raasteena, salaattina, paloina, keitettynä
 2. Perunaa, riisiä tai pastaa
 3. Liha tai kalaruokaa
 4. Ruokajuomana rasvaton maito tai piimä
 5. Leipää margariinilla
 6. Jälkiruokana marjoja ja hedelmiä
- Välipalana viljatuotteet, marjat, hedelmät, maitovalmisteet ja kasvikset



- Vinkki: Lapsen hyvän pääaterian voi koota lautasmallin avulla, lapsen ruoka-annos vain on pienempi kuin aikuisen!

RUOKAILUYMPÄRISTÖ

Leikki-ikäinen lapsi tutustuu ruokiin kokeilemalla, haistamalla, maistamalla ja tunnustelemalla. Lapsi tarvitsee rauhallisen, kiireettömän, turvallisen ja kannustavan ruokailuympäristön.

- huolehdi, että perhe syö säännöllisinä ruoka-aikoina ruokapöydässä
- ohjaa vähitellen lasta itse valitsemaan ja maistelemaan erilaisia ruokia
- kannusta lasta syömään omatoimisesti kiireettömässä ja turvallisessa ympäristössä

Lapsi tarvitsee monipuolisia kokemuksia ruuasta ja syömisestä. Ruokaan tutustuminen, ostoksilla mukana olo ja ruuanvalmistustehtävät lisäävät ruoan hyväksyttävyyttä ja arkisuutta; ruoka ei ole lohtu eikä palkinto, vaan osa normaalia arkea.

- Vinkki: Ota lapsi mukaan ruuanlaittoon ja leivontaan, näin saatte hauskaa yhteistä tekemistä ja lapsi oppii tärkeitä ruuanvalmistustaitoja.
- Vinkki: Tehkää yhteisiä sieni- ja marjaretkiä, näin saatte yhteistä laatu-aikaa ruuan ja liikunnan merkeissä ja saatte tuoreita ruoka-aineita ilmaiseksi!

PÄIVÄKOTI-ikäisten lasten liikuntasuosituks

- määrä – vähintään 2 tuntia reipasta liikuntaa päivittäin
- laatu – monipuolista ja vaihtelevaa liikuntaa erilaisissa maastoissa ja ympäristöissä
- ympäristö ja välineet – liikuntaan ja liikunnallisiin leikkeihin houkutteleva esteetön ympäristö sekä sisällä että ulkona ja erilaiset liikuntavälineet lapsen saatavilla

Kasvata liikuntaan & liikunnan avulla

- liikunnallisesti aktiivinen elämäntapa omaksutaan jo varhaislapsuudessa
- liikuntakasvatuksella tuetaan lapsen fyysistä, psyykkistä, emotionaalista ja sosiaalista kehitystä



LIikunnan määrä

Lapsi tarvitsee vähintään 2 tuntia reipasta liikuntaa päivittäin; liikunnan kokonaismäärä muodostuu pienistä osista päivän mittaan. Suurin osa lapsen liikunnasta koostuu omaehtoisesta liikkumisesta, jota lapsi tekee omasta halustaan ja mielenkiinnostaan, osana arkipäivän toimintoja ja hoitotilanteita.

- anna lapsen liikkua mahdollisimman paljon
- tarjoa lapselle tilaa ja aikaa – joka päivä useita mahdollisuuksia liikkua monipuolisesti vaihtelevassa ja innostavassa ympäristössä
- auta lasta suuntaamaan huomio liikunnallisen toiminnan kannalta oleelliseen tietoon
- kannusta ja rohkaise lasta liikuntatilanteissa
- anna lapsen tutkia ja harjoitella motorisia taitojaan
- Vinkki: tee pieniä ratkaisuja lapsesi arkipäivän liikunnallistamiseksi;
 - ruoka-aikaa odotellessa, anna lapselle erilaisia tasapaino-, hyppely- tai liikkumistehtäviä
 - päivä- tai yöunille mennessä, tee lapselle huonekaluista este- tai tempurata, joka johtaa sänkyyn (ota lapsesi mukaan radan rakentamiseen, jolloin jo rakentaminen on osa liikuntahetkeä)
 - anna lapselle eri aikoina ja eri ympäristöissä liikuntatehtäviä osana arkipäivän muita toimintoja

LIIKUNNAN LAATU

Lapsi tarvitsee monipuolista ja vaihtelevaa liikuntaa erilaisissa maastoissa ja ympäristöissä.

- Vinkki: Tarjoa lapsellesi monipuolisia kehonhallinta-, tasapaino-, tunto ja liikeaistimuksia
- Kehon hahmotus ja -hallinta
 - pyydä lasta osoittamaan eri kehonosia osana arkipäivän tilanteita
 - anna lapselle tehtäväksi liikkua niin, että vain tietyt kehonosat koskevat lattiaa (esim. polvet ja varpaat tai kädet, jalat ja takapuoli)
- Tasapaino
 - tee lapselle tasapainoiluratoja erilaisista alustoista, kuten tyynyistä, penkeistä ja rullatuista matoista
 - pyydä lasta jäljittelemään erilaisia tasapainoiluasentoja
- Tunto
 - rakenna lapselle konttausratoja erituntuisista alustoista, kuten sanomalehdistä, vilteistä ja makuualustoista
- Liikkeet
 - kierimis-, ryömimis-, konttaus- ja kiipeilyradat
 - juoksemis-, hyppimis-, laukkaamis- ja pyörimistehtävät
 - vierittämis-, heittämis-, kiinniotto- ja potkaisutehtävät

LIIKUNTAYMPÄRISTÖT JA -VÄLINEET

Lapsi tarvitsee liikuntaan ja liikunnallisiin leikkeihin houkuttelevia esteettömiä ympäristöjä sekä sisällä että ulkona. Lisäksi lapsen saatavilla tulisi olla erilaisia liikuntavälineitä.

- Vinkki: Liiku lapsen kanssa kaikkialla!
- sisällä;
 - eri tiloissa (esim. eri huoneissa)
 - erilaisilla rakenteilla ja alustoilla (esim. rappuset)
 - erilaisten äänten kanssa (esim. musiikki, vihellykset)
- ulkona;
 - erilaisilla hiekka- ja nurmialueilla (esim. hiekkalaatikko, nurmikenttä)
 - metsissä, puistoissa ja leikkipaikoissa
 - vedessä, lumella, jäällä
- välineet lapsen saatavilla;
 - eri kokoiset- ja painoiset pallot ja erilaiset mailat
 - trampoliini, vanteet, hyppynarut ja tasapainolaudat
 - päällä istuttavat, vedettävät ja työnnettävät lelut ja välineet
 - pyörät ja potkulaudat