Master's thesis

NTNU
Norwegian University of Science and Technology
Faculty of Medicine and Health Sciences
Department of Clinical and Molecular Medicine

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Relation Between Rural and Urban Schools in Regards to Physical Education Participation, Daily Physical Activity and Cardiorespiratory Fitness

A Cross-Sectional Pilot Study of Norwegian School Children

Master's thesis in Clinical Health Science with specialisation in Obesity and Health
Supervisor: Arnt Erik Tjønna
June 2019

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Kunnskap for en bedre verden

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Guro Rosvold

Trondheim, June 2019

Abstract

Background: Physical activity (PA) is decreasing in the transition from childhood to adolescence. Despite the growing body of school-based interventions counteracting lack of PA, reports reveal no increase in PA-level among Norwegian children from 2005 to present day. The relationship between urban and rural location regarding PA in children has attracted attention in several countries. However, the research is inconsistent. To our knowledge, similar studies have not been conducted in Norwegian school children. **Purpose:** Our aim was to investigate the relationship between rural and urban schools in regards to Norwegian school children`s moderate-to-vigorous PA (MVPA) - level during daily activity and in physical education (PE). The secondary aim was to investigate the relationship between residence in regards to children`s cardiorespiratory fitness (CRF) and (a) MVPA-level in PE, and (b) MVPA-level during daily activity. **Method:** 68 Norwegian 7th graders in urban (n = 45) and rural (n = 23) districts participated in a cross-sectional pilot study. PA was measured using SenseWear armband (SW), and CRF was measured using cardiopulmonary exercise testing (CPET). **Results:** Regarding residence, no between group-differences were found in average MVPA during daily activity (AvgMVPA) (p = .697). Rural children possessed higher peak oxygen uptake (VO_{2peak}) than urban children (p = .023). Both Moderate (p = .033) and High AvgMVPA-group (p = .069) displayed higher MVPA-level in PE than Low AvgMVPA-group. Finally, Moderate (p < .001) and High AvgMVPA-group (p < .001) possessed higher VO_{2peak} than Low AvgMVPA-group. **Conclusion:** The results demonstrates no difference in AvgMVPA between urban and rural school children. However, rural children possessed a higher VO_{2peak} than urban children. Both Moderate and High AvgMVPA-group displayed higher MVPA in PE and VO_{2peak} than Low AvgMVPA-group. These findings contribute to the understanding of whether interventions targeting only a single factor to increase overall PA among children, are the optimal solution or not.

Keywords: Physical activity, physical education, residence, school children, accelerometer, cardiorespiratory fitness.

Relevance

The majority of studies counteracting lack of PA among children are school-based. However, reports reveal no increase in PA-levels among children from 2005 to present day. The present study emphasizes the importance of increased awareness around the optimal setting(s) to increase PA among children and adolescents. Accordingly, contributing to knowledge regarding Norwegian school children`s lack of PA, which can be important for future public health initiatives to influence PA.

Abbreviations

AvgMVPA	Average moderate – to – vigorous physical activity during daily activity
BIA	Bioelectrical impedance analysis
BP	Blood pressure
CPET	Cardiopulmonary Exercise Test
CRF	Cardiorespiratory fitness
CVD	Cardiovascular disease
DLW	Double-labelled water
EE	Energy expenditure
HR	Heart rate
ISO-BMI	Age and sex adjusted body mass index
MET	Metabolic equivalent
MVPA	Moderate – to – vigorous physical activity
PA	Physical activity
PE	Physical education
SB	Sedentary behaviour
VO_{2max}	Maximum oxygen uptake
VO_{2peak}	Peak oxygen uptake
WC	Waist circumference

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1.0 Introduction

Childhood obesity has increased substantially since post-2000 and has become a global pandemic (1–5). If this increase continues, childhood to adolescence obesity is expected to surpass the prevalence of underweight by 2022 (1). Even though the prevalence of child obesity is potentially reaching a plateau, it remains alarmingly high and may be a future burden to health services (1,6,7). As a counter measure to this development, efficient evidence-based approaches are needed (8).

Obesity is a complex condition affected by factors such as: biological, social, environmental, behavioural and economic factors, ultimately leading to an unfortunate body composition (9,10). Fundamentally, obesity is caused by an imbalance between energy intake and expenditure (11). However, dietary data reports no increase in energy intake in recent years, and assume the increased weight is caused by a lack of physical activity (PA) (12).

PA is an important factor in children’s physical growth, social and mental development (13), and may prevent future lifestyle diseases such as cardiovascular disease (CVD) (14). PA is also one of the main determinants of cardiorespiratory fitness (CRF). Further, CRF is seen as a strong predictor of CVD, also among children. Noteworthy, the association between CRF and CVD seems to be stronger in children with low CRF, which in turn emphasizes the importance of improving CRF levels through PA (15,16). Thus, it is of concern that studies report a decrease in PA-level in the transition from childhood to adolescence, whereas some may not fulfil the recommended amount of 60 minutes of moderate-to-vigorous PA (MVPA) daily (13,17).

Counteracting the lack of PA among children, numerous studies have attempted to identify successful interventions, whereas most are school-based (18–25). The role of physical education (PE) in promoting health-enhancing PA in schools is well established (26,27). However, some studies suggest that schools, as a single factor in counteracting lack of PA among children, may not be the optimal setting. Importantly, interventions including a multi-stakeholder approach is now receiving increasing recognition internationally and seems to be slightly more successful than those addressing only a single factor (28,29). Although PE in schools provides a potential opportunity for increasing children’s overall PA-level, there is limited information available comparing children`s average MVPA during daily activity (AvgMVPA) with MVPA-level in PE. Thus, a better approach may be to investigate whether PE in school is the optimal setting to increase overall PA among children or not.

Addressing the environmental factor associated with childhood obesity, research investigating the relationship between urban and rural locations and PA has attracted attention in several countries (30–32). However, the findings are inconsistent (30–32). A potential mechanism behind the differences in PA-level between urban and rural locations may be the physical environmental factors. Access to sports facilities and programmes and time spent outside seem to be consistently associated with children`s PA (33). To our knowledge, similar studies regarding geographical location have not been conducted in Norwegian school children.

1.1 Objective and hypothesis

Our aim was to investigate the relationship between rural and urban schools in regards to Norwegian school children`s MVPA-level during daily activity and in PE. The secondary aim was to investigate the relationship between residence in regards to children`s CRF and (a) MVPA-level in PE, and (b) MVPA-level during daily activity.

Primarily, we hypothesized that children with high levels of AvgMVPA would have higher levels of MVPA in PE compared to the least active children. Additionally, it would be expected that urban school children have higher level of MVPA and CRF than rural school children. Secondarily, we hypothesized that it would exist a linear relationship between CRF and (a) MVPA-level in PE, and (b) MVPA-level during daily activity.

2.0 Theoretical Background

2.1 Definition and principles of physical activity

The World Health Organization defines PA as any bodily movement produced by skeletal muscles that requires energy expenditure (EE), whereas physical inactivity is a lack of PA (34). PA is a wide term including several subcategories such as play, exercise, PE, outdoor life and leisure activities. PA can be measured by frequency, duration and intensity, which define the volume of PA (35). Furthermore, studies often express PA as MVPA, possibly due to the strong association to cardiometabolic risk factors in youth regardless of time spent sedentary (36). To express intensity of PA, metabolic equivalent (MET) is commonly used. 1 MET is calculated as 1 kcal/kg/hour - corresponding to the energy cost of sitting quietly (37). METs cut-off values used in the present study are presented in Table 1 on the basis of previous literature (38,39) with examples of activities performed by intensity level (40,41).

Table 1. METs cut-off values with examples of activities performed by intensity level

Sedentary (Up to 1.5 METs)	**Light (1.5 -4.3 METs)**	**Moderate (4.3-7.0 METs)**	**Vigorous (7.0-9.0 METs)**	**Very Vigorous (9.0 METs and higher)**
Watching TV	Walking (3-5 km/h)	Brisk walking (7 km/h)	Jogging (9 km/h)	Running at a high pace
Playing video games	Bowling	Volleyball	Trail biking	Rowing at a high pace
Sitting on a chair	Fishing	Light calisthenics	Water-skiing	Ice hockey
Reading a book	Snowmobiling	Hiking	Bicycle ergometer at vigorous pace	Soccer

MET; Metabolic equivalent (38–41)

2.2 Physical activity recommendation and level of physical activity in children

Pleasurable activities during childhood and adolescence lay the foundation for lifelong joy of movement. The Norwegian Directorate of Health recommend children and adolescents to engage in PA for at least 60 minutes a day. The activity should be of at least moderate intensity and include a variety of exercises. At least three times a week, the activity should be of high intensity and include activities that increase muscle strength. Prolonged sedentary behaviour (SB) should be minimized and replaced with active breaks (42,43).

Several surveys have been published investigating Norwegian children and youths activity levels (17,44–46). UngKan is a descriptive study in Norway where the objective is to identify PA habits among children and adolescents. Findings shows that boys tend to be more active than girls, especially in activities with moderate to hard intensity. A comparison of UngKan1 -, 2 - and 3 revealed a slight decline in the odds for satisfying the recommendations for PA among 9-year olds. Among 15-year-olds, there was no significant difference in the percentage of those who satisfied the recommendations for PA between 2005 and 2018 (17). Furthermore, numbers show that significantly more normal-weighted children satisfied the recommendations for PA compared with obese children (47). Figure 1 presents how many of the 6-, 9- and 15-year-olds fulfilled the recommended of at least ≥ 60 minutes of MVPA per day in 2005, 2011 and 2018 (17).

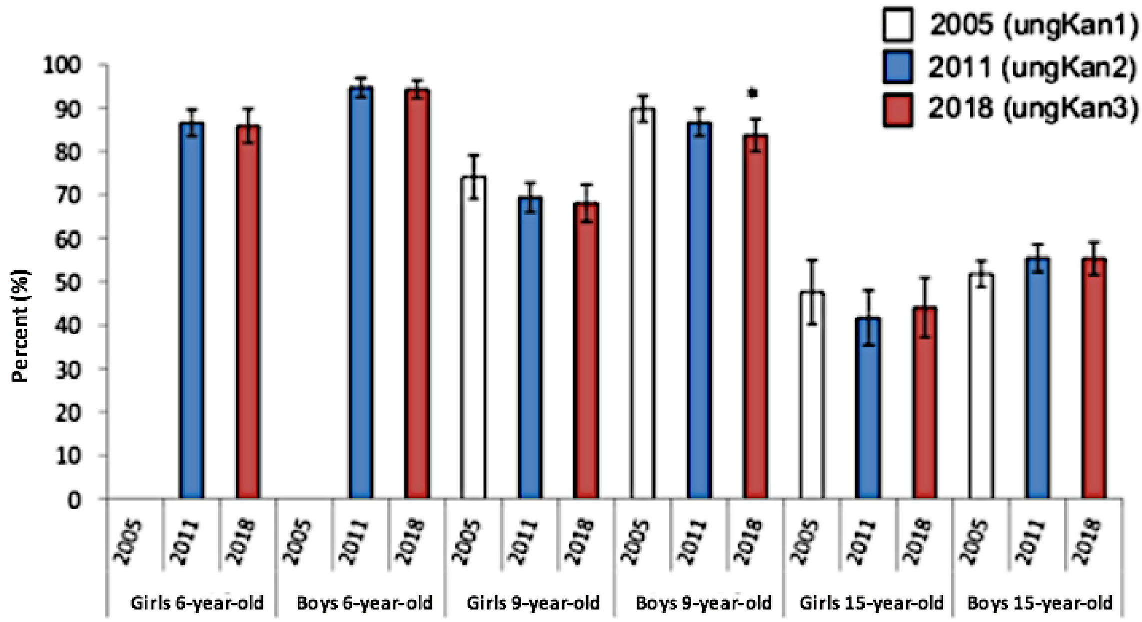

Figure 1. Percentage share (%) of girls and boys in the three age groups who met the recommendation of ≥60 minutes of moderate-to-vigorous PA per day in 2005, 2011 and 2018 (6-year-olds were not included in the first survey in 2005) (n = 8863). Error bars represent 95 % confidence interval. *The boys in 2018 were significantly different from the boys in 2005 (p= .013). *(Borrowed with permission from Steene-Johannessen et al. 2019 (17))*

2.3 Physical activity, sedentary behaviour and health

While childhood obesity is increasing worldwide (1–5), the rate of PA among children and adolescents is declining with increased age (17) . According to the energy balance equation, there is evidence suggesting that obesity is highly associated with inactivity. Current knowledge demonstrate that PA has a protective effect on adiposity among children (48), along with numerous other health benefits (49,50). To achieve all the health benefits an active lifestyle results in; PA must be conducted regularly throughout life (51). High levels of SB, on the other hand, have negative outcomes on health (52–54). Hence, it is of concern that Norwegian 6-year-olds spend about 50 % of their day sedentary. Corresponding numbers for 9 and 15-year-olds are 60 and 70 % (55). Figure 2 illustrates the positive and negative consequences of SB and PA, respectively (56,57).

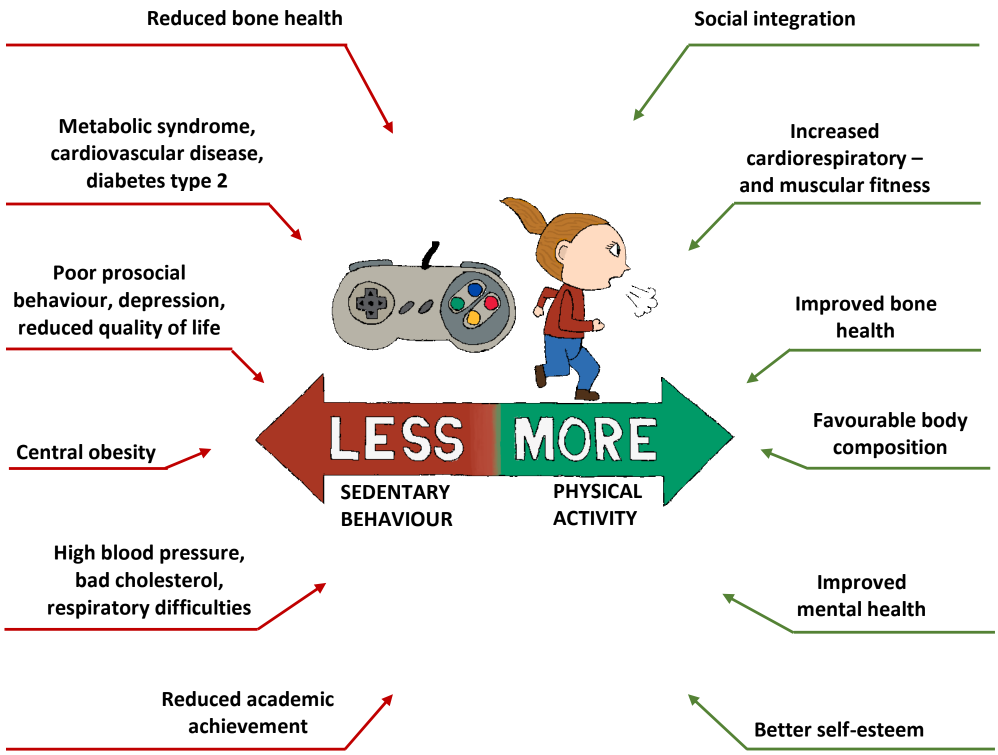

Figure 2. Positive and negative consequences of sedentary behaviour and physical activity, respectively (56,57)

2.4 Schools and physical activity

The huge number of school-based interventions may be explained by the accessibility to children and adolescents, large amount of time spent at school and the central role of health in PE (19). However, the Norwegian PE-curriculum currently adopted in schools seems to be most suited for those mastering the field best, and thus not affecting the children who primarily need to increase their PA-level. Accordingly, the content of current PE include extensive use of ball games. This seems to have a negative impact on the well-being of some children. Furthermore, current Norwegian PE-curriculum has about the same number of hours as existed in 1959, despite the fact that children's PA-level has significantly reduced (12). However, the Norwegian Parliament recently submitted a proposal to Government seeking to secure at least one hour of PA per day within teaching hours for every school child enrolled between 1st and 10th grade. The Government approved the proposal, however did not allocate funds, allowing one hour of daily PA during school-hours as a goal rather than a demand (23). Even though PE is the perfect arena to engage all children to be physically active, studies report low levels of MVPA among children during PE (58–60). It is also shown that the PA-level in PE increases among children if the academic competence in PA, health and lifestyle is high among teachers (61).

2.5 Urban and rural built environment

Urbanization has been highlighted as a factor that influences PA, SB and CRF in youth (62). PA, SB and CRF is determined by several factors, most notably the environment. Environmental exposure might determine lifestyle behaviour such as eating habits, access to sport facilities and opportunities for PA (63). Available data relating residence to PA, SB and CRF indicate somewhat variable results. Due to potential confounders including cultural and social differences, climate and methods of assessment, it is difficult to generalize geographic variations in PA, SB and CRF across countries (64).

2.6 Measurement of physical activity

There are some challenges in assessing PA among children and adolescents, mainly due to their sporadic activity pattern (65,66). Thus, it is important that measuring tools produce accurate results. The measuring tool has to measure what it is supposed to measure (valid) and produce similar results with repeated measurements (reliable). An additional aspect that is important in the assessment of PA is feasibility. Feasibility refers to costs and skills required for using the devices, reactivity issues, tolerance of the device and amount of missing data (67). Several techniques have been used to assess and measure PA in children and adolescents, with the use of each method having its advantages and disadvantages (66). Generally each method used to measure PA is divided into two different categories; subjective and objective measurements (68).

2.6.1 Subjective measurement

In epidemiological studies the most readily used methods for measuring PA, are subjective. The reasoning behind using subjective methods is often contributed to the low cost and ease at which they can be administered. Subjective survey techniques can be classified into four categories: self-report questionnaires, interviewer-assisted questionnaires, proxy-report questionnaires and diaries. Self-reported questionnaires are the most commonly used method in epidemiological studies to estimate PA among older children and adolescents. They are low in cost, have a relatively low participant burden, ease of administration and have the ability to record type of activity and the context in which PA is performed. However, this method is problematic as younger children may have difficulties in correctly interpreting questions and accurately recalling their PA (69,70). Thus, caution should be taken due to probability of bias, impaired memory and under and over estimation of PA due to different factors (complexity of the questionnaire, social desirability, seasonal variation, age, length of period surveyed) (71).

2.6.2 Objective measurement

Objective methods are the optimal technique for assessing amount and intensity of PA and SB among children and adolescents, as they are less likely to produce biased measures. Reilly et al. (2008) reported in their review that children have a tendency to over-report their PA using subjective measurements, and thus concluded that assessment of interventions aimed at PA - and SB change should use objective methods (72). Objective methods to measure PA include direct and indirect calorimetry, direct observation, double labelled water (DLW), heart rate monitors, pedometers and accelerometers (66). DLW is considered as the "gold standard" of appointing EE, due to the high accuracy of measurements. However, DLW is costly and time-consuming, and does not give any information about duration or intensity of PA (71). Alternatively, the accelerometer has been proven to be a valid and reliable instrument in assessing of PA in children (73). Accelerometers estimate intensity, duration, frequency and respond to alteration in velocity in different axes (74). Usually accelerometers are distinguished between two type of monitors; uniaxial (one axis) and multiple axis (two or three axis). When children is measured by an accelerometer, it is recommended that the device is small, has high reliability and ability to store as much time-resolved information as possible for the desired monitoring period. Additionally, it should be suited a child`s range of movement for beneficial measure of acceleration (73). Although Actigraph is the most commonly used accelerometer in assessment of PA (75), SW has been recognized as a feasible instrument in children. SW contains a triaxial accelerometer and sensors measuring near-body ambient temperature, speed, skin temperature, galvanic skin response and heat flux. Along with characteristics such as gender, age, weight, height, smoking status and right or left handedness; total steps walked, SB, intensity in METs, total EE in $kcal \cdot day^{-1}$ and activity EE in $kcal \cdot day^{-1}$ can be estimated (76). Regarding the recommended minimum days of measurement, a monitoring period of 7 days is considered the "gold standard" for estimating PA and SB (77).

2.7 Measurement of cardiorespiratory fitness

The international reference standard for estimating CRF is maximal oxygen uptake (VO_{2max}) (78,79). It was defined by Hill et al. (1923) (80,81), and is expressed by Fick`s equation: "$Oxygen\ uptak = (stroke\ volume \times heart\ rate\ (HR)) \times (aterial\ oxygen\ content - mixed\ venous\ oxygen\ content)$" (82). $VO_{2max}$ is a product of the capability to extract and utilize oxygen from ambient air into the capillaries of the lungs, as well as the body`s capability to transport oxygen-rich blood through the vascular system, and thereafter into the muscles (83). The body`s ability to consume oxygen has a physiological upper limit, visualized as no further increase in oxygen uptake despite increased load (speed/incline) (79). There are several limiting factors for VO_{2max}; central factors such as maximal cardiac output, pulmonary diffusing capacity, oxygen-carrying capacity of the blood, and peripheral factors such as skeletal muscle characteristics (84). Cardiopulmonary exercise testing (CPET) is seen as an important clinical tool to evaluate CRF and predict outcomes in patients with CVD. It is also used for objective determination of functional capacity and impairment, as well as evaluating undiagnosed exercise intolerance. CPET measures the capability of the skeletal and cardiopulmonary system (cardiovascular and respiratory system) to respond to an increase in the metabolic demands of the body (82,85), involving measurements of carbon dioxide production, respiratory oxygen uptake and ventilatory measures (82).

3.0 Material and Methods

3.1 Subjects

68 Norwegian 7th-graders (mean age: 12.1 years old) from Trondheim and surrounding areas were included in the present study. The subjects were divided into two groups, urban (n = 45) and rural location (n = 23). The children were recruited through flyers, where selected schools were asked to attend a research project via email. Representative schools were thereafter presented with a brief introduction about the project by the research team, initially informing the school faculty staff and thereafter the school children. At this point, school children and teachers had the opportunity to ask questions to research members about the project. Information sheets, one for the parents (Appendix 1) and one for the children (Appendix 2), were handed out, as well as written informed consent; approved by the Regional Committees for Medical and Health Research Ethics (2018/950, Appendix 3). The deadline to hand in their written consent was set to approximately one week after handout. Exclusion criteria was pulmonary diseases involving severe/poorly controlled asthma, diabetes, smoking, neurological/orthopaedic limitations according to exercise, history of seizures or epilepsy, steroid medications, diagnosed attention deficit hypersensitivity disorder, kidney failure (self-reported), major organ transplants, family history of hypertrophic obstructive cardiomyopathy, congenital cardiac abnormalities, elevated blood pressure (> 95th percentile for systolic/diastolic values), abnormality during resting or stress echocardiography (unsafe to participate) and coronary heart disease. A total of 8 participants withdrew during the study due to personal reasons.

3.1.1 Residence classification

Residence was classified using previous literature, and defined based on density of population. Urban areas were defined as; including at least 50 000 inhabitants in contiguous local living areas with more than 500 inhabitants per square kilometre. Rural areas were defined as thinly populated areas with less than 50 000 inhabitants in the contiguous local living areas with less than 100 inhabitants per square kilometre (86).

3.2 Study design

The study is a cross-sectional pilot study. The data were collected from early January to late March 2019, and took place at St. Olav Hospital and respective schools. CPET, blood pressure (BP), bioelectrical impedance analysis (BIA), height and weight were measured at Next Move´s exercise lab - localized at St. Olav Hospital. Blood samples and waist circumference (WC) were conducted at the respective schools. Identical medical equipment was used to avoid methodological errors. SenseWear armband (SW) were handed out at respective school, worn by participants for a 7-day period and collected by the research team upon completion. HEVAS questionnaires were handed out, predominantly after CPET measurements, and picked up by the research team at the respective schools thereafter. The parents/guardians were given access to a booking system created in Google Docs. Here they could make an appointment to Next Move`s exercise lab by filling in their child`s ID at the best suitable timepoint.

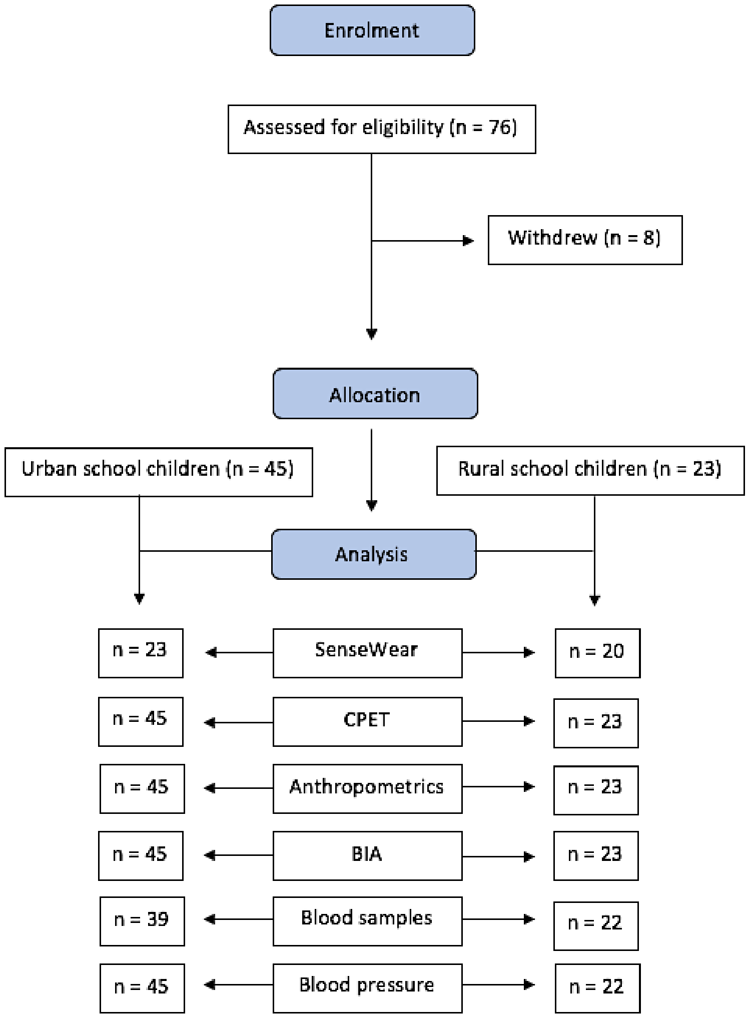

Figure 3. Flow chart of study design

3.3 Data collection

3.3.1 SenseWear accelerometer

The primary outcome measure was PA objectively measured using SW accelerometer (BodyMedia Inc., Pittsburgh, PA, USA). The pupils were asked to wear the SW around the dominant arm (over the triceps muscle) with the two lights pointing down for a 7-day period (24 hours a day), excluding during water-activity (showering, swimming). Use of SW was supported with written instructions (Appendix 4).

Figure 4. Illustration of placement of SW accelerometer

3.3.2 Bioelectrical impedance analysis

Body composition was measured using a multi-frequency BIA (Inbody 720, Biospace CO, Ltd, Seoul, Korea). BIA measures body composition by dividing the body into trunk, lower and upper extremities. The device predicts extra and intracellular water content, which is used to estimate body composition. In advance, the participants were asked to fast for at least 12 hours (apart from drinking water) prior to measurements. In addition, they were instructed to avoid PA the day preceding test-day. The subjects were encouraged to go to the toilet if required before measurements. Furthermore, subjects were instructed to remove any objects containing metal (watches, jewellery, belts, wallet, mobile phone) before standing barefoot on the BIA. When entering the aperture, the subject was instructed to maintain an upright position, avoiding contact between trunk and upper extremities. Talking during measurement was not permitted in order to obtain a normal breathing pattern.

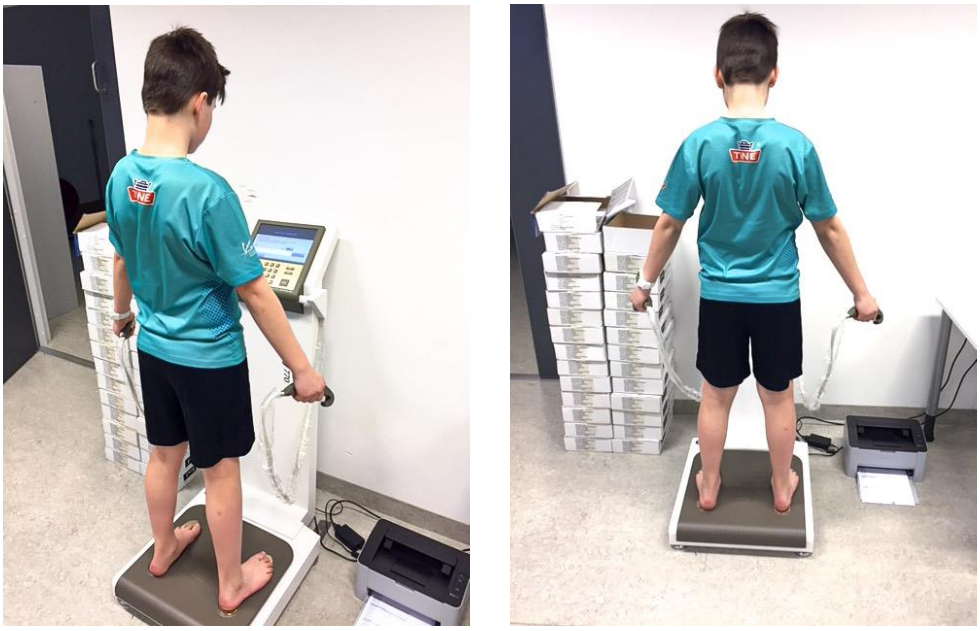

Figure 5. Illustration of posture during measurements using BIA

3.3.3 Anthropometric measurements

Height was measured without shoes using a stadiometer (Nearest 0.1 cm). Body weight was measured using BIA with light clothing (Nearest 0.1 kg). Age and sex adjusted body mass index (ISO-BMI) was calculated using the international standard (87). WC was measured using a measuring tape between the lowest palpable rib and iliac crest (Nearest 0.5 cm).

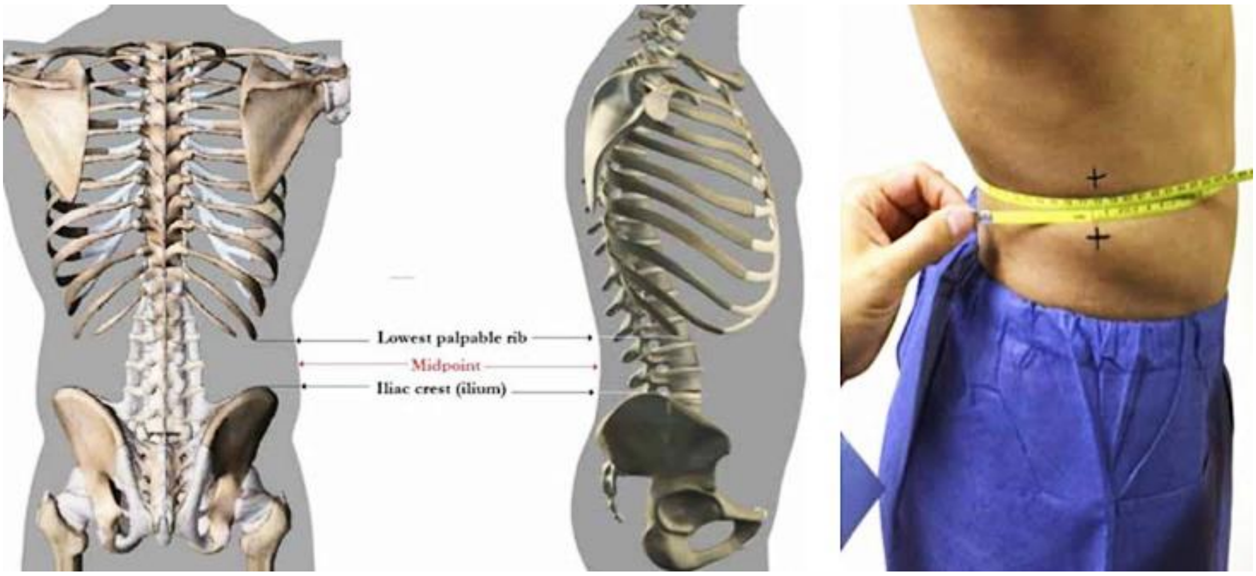

Figure 6. Illustration of the waist circumference measuring procedure (88)

3.3.4 Cardiopulmonary exercise testing

Exercise capacity was measured using CPET, which estimates VO_{2max}. The test was performed on a treadmill (Woodway USA Inc., Waukesha, WI, USA), using an ergospirometry system with a mixing chamber (Metalyzer II, CORTEX Biophysik GmbH, Leipzig, Germany) to measure oxygen uptake. Volume calibration was performed for each test (3L Calibration Syringe, Hans Rudolph, Lenexa, USA) and gas calibration was performed before the testing began with ambient air (0.03 CO_2, 20.93 O_2) and calibration gas (5% CO_2 and 15% O_2) (HIQ Center, AGA A/S, Oslo, Norway). Every 6th test the sample line was changed and calibration repeated. Barometric pressure was read off on the weather station. To measure HR, a Polar H7 HR transmitter (Polar Electro, Kempele, Finland) was used. 5 beats were added to the HR achieved at VO_{2max} or peak, and set as the subject's maximal HR (89). Prior to the test, each participant was informed about the procedure, including Rated Perceived Exertion, Borg scale (90). The test started with 2 minutes of rest with the mask on, to check the levels of oxygen uptake. As a warm-up and to familiarize with the subject, two submaximal tests consisting of 4 minutes each were completed according to a standardized load (4km • h^{-1}, and 0 and 4% inclination respectively). Thereafter, the VO_{2max}-test began, following an individualized protocol; incline and/or speed were increased 2% or 1 km • h^{-1} after each minute. Borg scale was noted after each submaximal test and at the end of the max-test. Similarly, HR was noted after 2 minutes of rest, after each submaximal tests and max-test. Also, respiratory exchange ratio; which describes the ratio of carbon dioxide expired and oxygen inspired, were documented immediately after the max-test. Furthermore, a stopwatch was started at the end of the test to measure 1-minute heart rate recovery. The 3 continuously highest measurements determined the VO_{2max}, shown as a plateau in consumption of oxygen despite increased work rate. To classify a value as VO_{2max}; Respiratory exchange ratio $\geq$ 1.05, Breathing frequency > 40 and Rated Perceived Exertion above 17/20 on the Borg scale were required. If not met, VO_{2peak} was used (91).

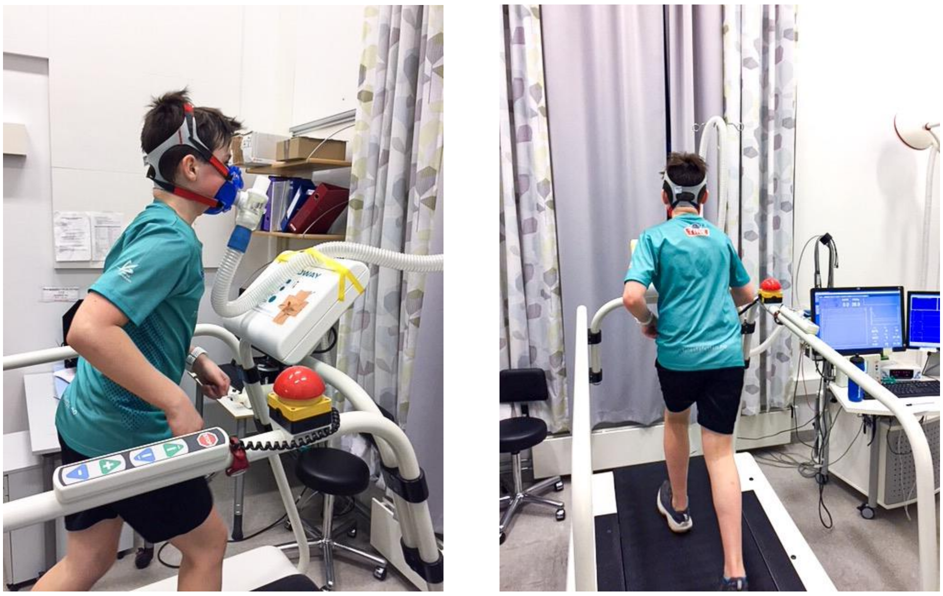

Figure 7. Illustration of CPET measurements

3.3.5 HEVAS Questionnaire

The participants were handed a standardized questionnaire (92) involving questions regarding PA, recreational activities, subjective health and well-being, and social health (Appendix 5). The pupils filled out questionnaires anonymously and under the supervision of their parents.

3.3.6 Blood samples

Fasting glucose, cholesterol, triglyceride and high-density lipoprotein cholesterol were collected from each participant at the respective schools following 12 hours of fasting. The vacutainers were kept in room temperature for 30 minutes, before being centrifuged for 10 minutes at 1500 G. Prior to the blood test (30 minutes), all subjects was asked if they wanted a local anaesthetic plaster.

3.3.7 Blood pressure

BP was measured with a Diacore Criticare 506N-2 (Criticare Systems Inc., Waukesha, WI, USA). Before measurements, each participant was asked to sit down for approximately 10 minutes. Measurements were conducted 3 times, with 1 minute between each measurement; all at the dominant arm. An extra measurement was completed if the value of the two last measurements differed with > 15 % (systolic or diastolic). The standing value was calculated from the mean BP of the two last measurements. During the BP-measurements participants were instructed to be quiet. Furthermore, the display of the apparatus was pointing away from the participant in order to avoid possible disturbance that could affect the results.

Figure 8. Illustration of subject`s posture during blood pressure measurements

3.4 Statistics

Statistical Package for the Social Sciences 25 (SPSS) (IBM Corp., Armonk, New York, USA) was used in performing statistical analyses, as well as graphical illustrations. Data are presented as mean ± standard deviations, unless otherwise stated. Significance level was set at $\alpha = 0.05$. Normal distribution was examined by Shapiro-Wilk test and visually through inspection of Quantile-Quantile Plot. Independent sample *t*-test were ran in order to investigate if there was a statistical significant mean difference between rural and urban school children regarding AvgMVPA, anthropometrics, body composition, blood samples and BP. Scatter plot were ran in order to evaluate the linearity between AvgMVPA and MVPA-level in PE. Data from SW were thereafter stratified into three groups in accordance with their AvgMVPA. The cut-off was set at the > 25^{th}, 25^{th} – 75^{th} and < 75^{th} percentile. The standing value was labelled as: Low AvgMVPA, Moderate AvgMVPA and High AvgMVPA, respectively. Two-way ANOVA and LSD post-hoc tests were ran in order to conduct the interaction effect between residence and AvgMVPA on MVPA-level in PE, as well as between-group differences. Levene's Test of Equal Variances was used to check the homogeneity of variance. Pearson`s correlation was ran in order to assess the relationship between AvgMVPA and VO_2 peak. Due to non-normal distributed values, the non-parametric Spearman correlation test was ran to conduct the relationship between MVPA in PE and VO_2 peak.

4.0 Results

4.1 Subject characteristics

Subject characteristics are presented in Table 2.

Table 2. Subject characteristics

	Urban (n = 23)	Rural (n = 20)	Mean Difference (95 %)	P-value
SW				
AvgMVPA	2:30:26 ± 1:08:12	2:31:57 ± 1:11:43	-0:44:39 to 0:41:37	.994
	Urban (n = 45)	**Rural (n = 23)**	**Mean Difference (95 %)**	**P-value**
Anthropometric variables				
Height (cm)	158 ± 7.1	160.5 ± 7.5	-6.21 to 1.22	.185
Weight (kg)	49 ± 9.4	49.8 ± 8.5	-5.52 to 3.98	.748
ISO-BMI (kg/m^2)	19.5 ± 3.2	19.2 ± 2.8	-1.26 to 1.85	.706
Waist circumference (cm)	66 ± 8.2	66.4 ± 5.9	-4.26 to 3.43	.831
Body composition				
Muscle mass (kg)	20.5 ± 3.3	21.6 ± 3.2	-2.75 to 0.63	.215
Body fat (kg)	10.9 ± 6.5	9.7 ± 5	-1.96 to 4.23	.468
Body fat (%)	21.1 ± 8.6	18.9 ± 7.2	-1.97 to 6.41	.294
	Urban (n = 39)	**Rural (n = 22)**	**Mean Difference (95 %)**	**P-value**
Blood variables				
Cholesterol ($mmol \bullet L^{-1}$)	4.23 ± 0.70	3.93 ± 0.66	-0.07 to 0.66	.115
Triglyceride ($mmol \bullet L^{-1}$)	0.64 ± 0.25	0.85 ± 0.54	-0.42 to -0.01	.040
HDL-C ($mmol \bullet L^{-1}$)	1.64 ± 0.37	1.53 ± 0.35	-0.08 to 0.31	.234
Fasting glucose ($mmol \bullet L^{-1}$)	5.2 ± 0.9	4.9 ± 0.3	-0.16 to 0.67	.230
	Urban (n = 45)	**Rural (n = 22)**	**Mean Difference (95 %)**	**P-value**
Blood pressure				
Systolic blood pressure (mmHg)	111 ± 9	115 ± 8	-9.18 to 0.62	.086
Diastolic blood pressure (mmHg)	69 ± 6	73 ± 8	-7.64 to -0.36	.032
Mean arterial pressure (mmHg)	83 ± 7	86 ± 8	-7.10 to 0.72	.108

Data presented as mean ± standard deviation, mean difference (95%) and p-value. AvgMVPA; average moderate-to-vigorous physical activity during daily activity, ISO-BMI; Age and sex adjusted body mass index, HDL-C; high-density lipoprotein cholesterol

4.2 Children`s MVPA-level during daily activity and in physical education

4.2.1 Relationship between MVPA-level during daily activity and in physical education

Presented in Figure 9, we found no linear relationship between AvgMVPA and MVPA in PE, but displayed a tendency towards linearity (p = .058).

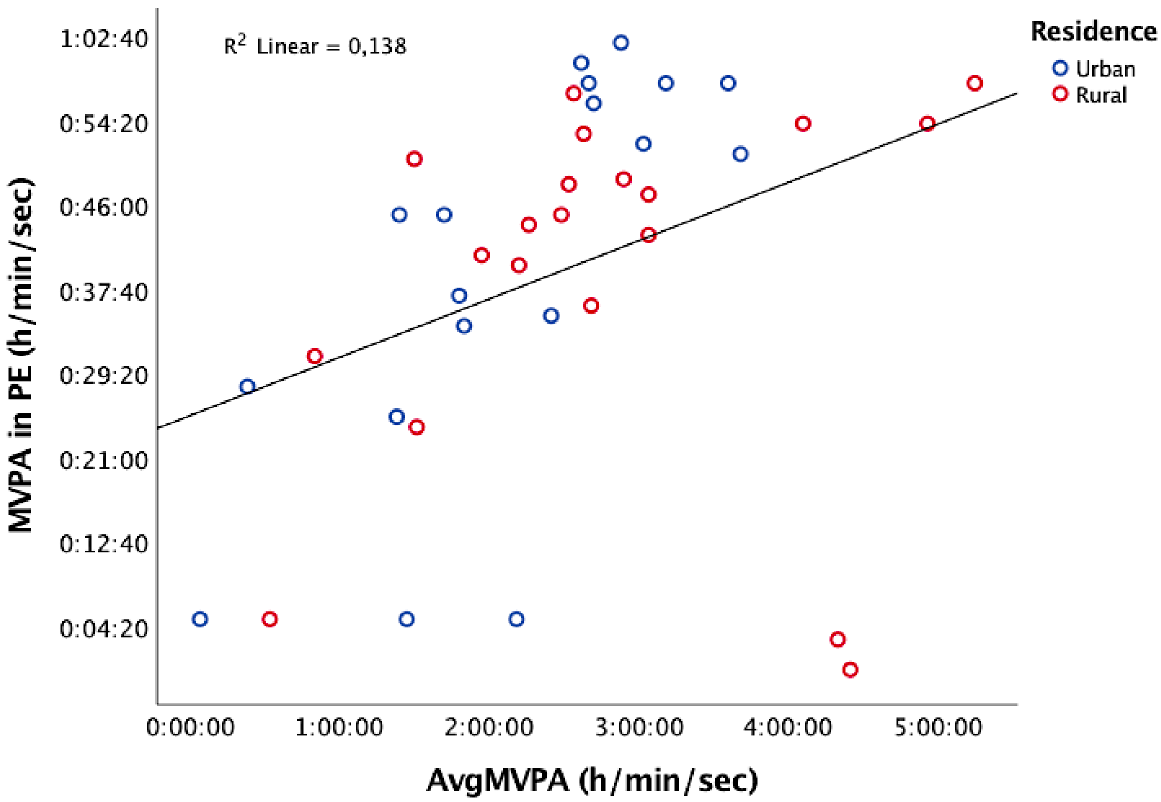

Figure 9. Relationship between average moderate-to-vigorous physical activity during daily activity (AvgMVPA) and MVPA possessed in physical education (PE)

4.2.2 Differences between MVPA-level during daily activity and in physical education

Participating schools differed in their PE-schedule, and mean PE time was 67 minutes. The total of children used in average 39 minutes of PE in MVPA. Low AvgMVPA-group possessed in average 26 minutes of PE in MVPA. Corresponding numbers for Moderate AvgMVPA-group and High AvgMVPA-group were 45 and 42 minutes, respectively. We found no significant interaction between residence and AvgMVPA-groups on MVPA-level in PE (p = .153). No significant differences in level of MVPA in PE were detected between urban and rural school children (p = .697). Thus, further results will be discussed without interaction. With respect to MVPA-level in PE, there was a significant difference in MVPA-level between the AvgMVPA-groups (p = .033) (Figure 10). Post-hoc analysis revealed that Moderate AvgMVPA-group possessed a significantly higher level of MVPA in PE than Low

AvgMVPA-group (p = .011, 95 % CI [0:04:38, 0:32:50]). Additionally, a trend indicates that High AvgMVPA-group possessed a 66.7 % higher level of MVPA in PE than Low AvgMVPA-group (p = .069, 95 % CI [- 0:01:18, 0:32:36]). No significant differences were detected between Moderate AvgMVPA-group and High AvgMVPA-group (p = .682, 95 % CI [- 0:12:06, 0:18:16]).

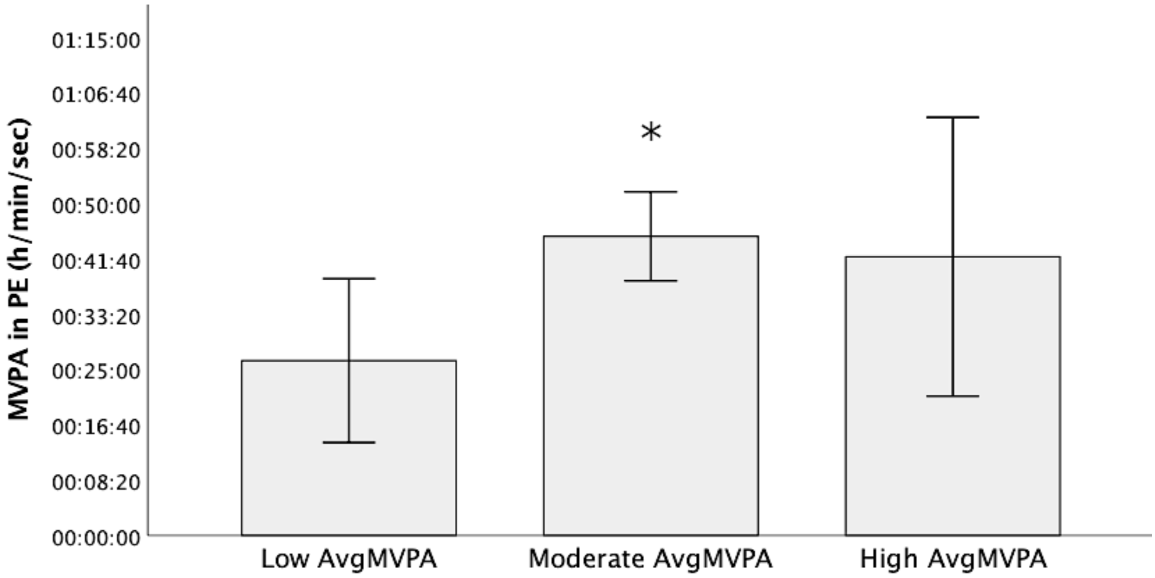

Figure 10. Comparison of average moderate–to–vigorous physical activity during daily activity (AvgMVPA) and MVPA-level in physical education (PE) among Norwegian school children. Data are presented as mean ± 95 % confidence interval. AvgMVPA was stratified in groups. * Statistically significant difference between Moderate AvgMVPA and Low AvgMVPA (p = .011)

4.3 Cardiorespiratory fitness

There was no significant correlation between VO_{2peak} and MVPA-level in PE (r = .242, p = .143). Furthermore, there was a strong correlation between VO_{2peak} and AvgMVPA (r = .590, p < .001) as illustrated in Figure 11. AvgMVPA accounted for 34.8 % of the variability in VO_{2peak} values (r^2 = 0.348).

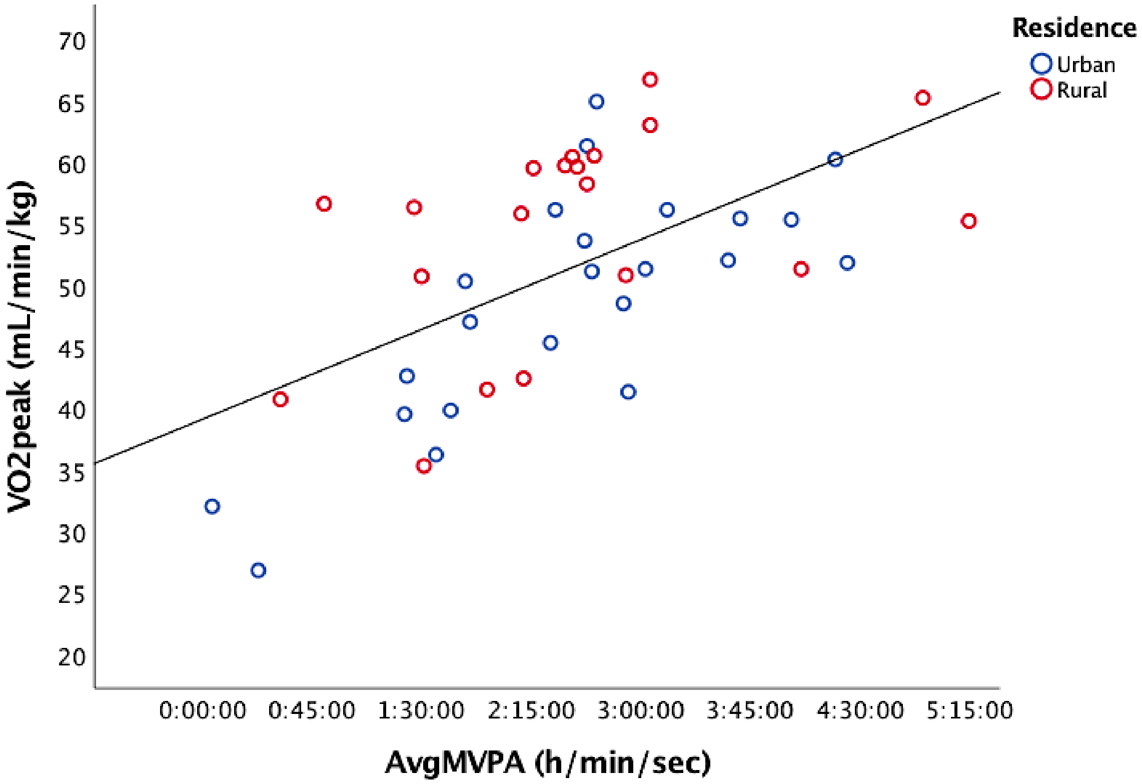

Figure 11. Linear relationship between average moderate – to – vigorous physical activity during daily activity (AvgMVPA) and peak oxygen consumption (VO_{2peak})

A Two-way ANOVA showed no significant interaction between residence and AvgMVPA-groups on VO_{2peak} ($p = .192$). Thus, further analyses are being discussed without interaction. However, there was a significant between-groups difference in VO_{2peak} among AvgMVPA-groups ($p < .001$) (Figure 12). Post-hoc analysis showed that High AvgMVPA-group had significantly higher VO_{2peak} than Low AvgMVPA-group ($p = .000$, 95 % CI [7.66, 20.64]). Accordingly, Moderate AvgMVPA-group possessed a higher VO_{2peak} than Low AvgMVPA-group ($p = .000$, 95 % CI [6.12, 16.53]). No statistical significant differences were detected between the Moderate AvgMVPA-group and High AvgMVPA-group ($p = .330$, 95 % CI [-8.62, 2.97]). Furthermore, a significant between-group difference in VO_{2peak} was detected between residences ($p = .023$). Post-hoc analysis showed that rural school children possessed a significantly higher level of VO_{2peak} in average than urban school children ($p = .023$, 95 % CI [.830, 10.39]). Rural school children had a mean VO_{2peak} at 53.33 mL/min/kg , while corresponding numbers for urban school children were 47.72 mL/min/kg.

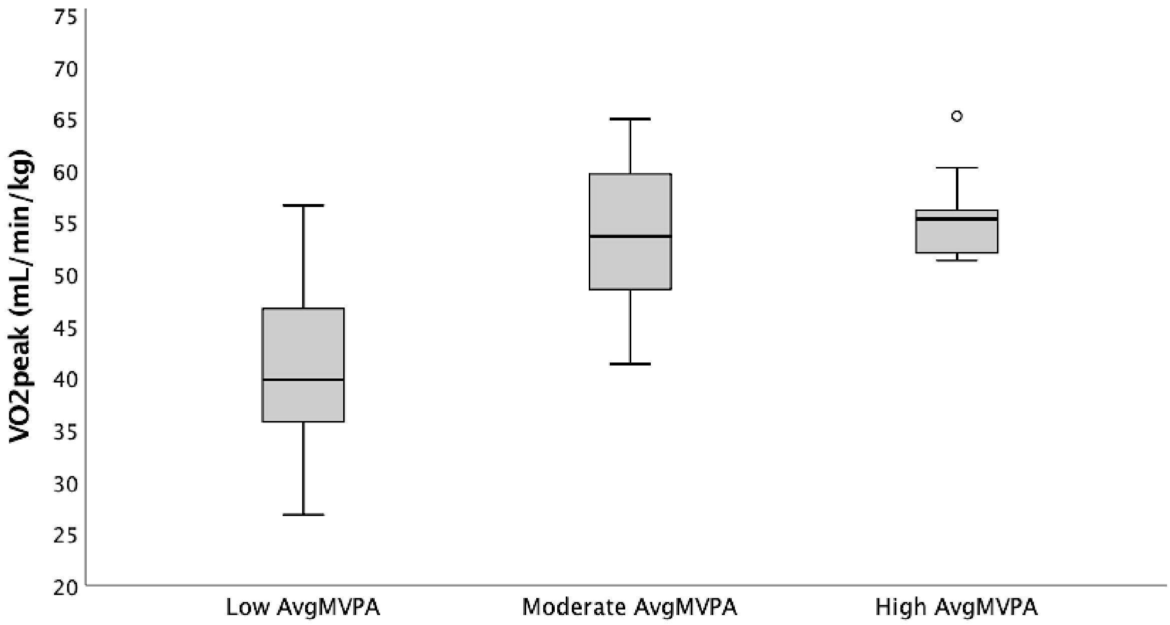

Figure 12. Comparison of average moderate–to–vigorous physical activity during daily activity (AvgMVPA) and peak oxygen consumption (VO_{2peak}) among Norwegian school children. Data are presented as mean ± 95 % confidence interval. AvgMVPA was stratified in groups. ° outlier

4.4 HEVAS

An overview of selected questions from HEVAS questionnaire is presented in Table 3.

Table 3. Numbers from selected questions retrieved from HEVAS questionnaire.

		Urban (n = 44)	Rural (n = 23)
Participate in sports	Yes	36 (81.8)	19 (82.6)
	No	8 (18.2)	4 (17.4)
Transport to school	By walking/bike	43 (97.7)	17 (73.9)
	Bus	0 (0)	5 (21.7)
	Car	1 (2.3)	1 (4.4)
Transport from school	By walking/bike	44 (100)	17 (73.9)
	Bus	0 (0)	6 (26.1)
	Car	0 (0)	0 (0)
Distance to school	< 5 minutes	9 (20.5)	0 (0)
	5-15 minutes	23 (52.3)	8 (34.8)
	15 – 30 minutes	11 (25)	15 (65.2)
	30 – 60 minutes	1 (2.2)	0 (0)
	> 60 minutes	0 (0)	0 (0)
Living conditions	House	11 (25)	21(91.3)
	Row house	28 (63.6)	1 (4.4)
	Apartment	1 (11.4)	1 (4.4)

Data is presented as numbers (percent %)

5.0 Discussion

Our aim was to investigate the relationship between rural and urban schools in regards to Norwegian school children`s MVPA-level during daily activity and in PE. The main findings of the present study included no significant interaction between residence and AvgMVPA-groups on MVPA-level in PE ($p = .153$) and no significant between-group differences among urban and rural school children in level of MVPA in PE ($p = .697$). Furthermore, Moderate AvgMVPA-group possessed a significantly higher level of MVPA in PE than Low AvgMVPA-group ($p = .011$). Additionally, a trend indicated that High AvgMVPA-group possessed a 66.7 % higher level of MVPA in PE than Low AvgMVPA-group ($p = .069$). No significant differences were found between Moderate AvgMVPA and High AvgMVPA ($p = .682$).

5.1 Children`s MVPA-level during daily activity and in physical education

5.1.1 Relationship between MVPA-level during daily activity and in physical education

As previous stated in our hypothesis, we expected a linear relationship between AvgMVPA and MVPA in PE. However, our results displayed no significant linearity between AvgMVPA and MVPA in PE, but showed a clear trend. These findings are inconsistent with a previous study conducted by Cheung (2019), finding children to engage in a comparable proportion of MVPA during PE time and after-school hours (58). Several outliers below the regression line in the linearity analysis between AvgMVPA and MVPA in PE was assumed to affect our interpretation of data. For children with elevated levels of AvgMVPA, they show an unexpected low MVPA-level in PE. An increased sample size could be beneficial for a trend towards linearity. It was noted that the study subject who deviated from the regression line were registered as less active than normal due to not feeling well during PE on experimental day. Also, PE content could have conflicted with personal interests of study subjects on that certain day. Moreover, studies have speculated whether children compensate by being less active in one domain if they increase their PA in another domain. This theory is called “The ActivityStat hypothesis” (93). Frémeaux, Mallam, Metcalf, Hosking, Voss and Wilkin (2011) wanted to explore “The ActivityStat hypothesis” in British primary school children. They found that children actually do compensate in such a way that more activity at one time is met with less activity at another (94), which support the theory.

5.1.2 Difference between MVPA-level during daily activity and in physical education

With respect to MVPA-level in PE, no significant interaction was found between residence and AvgMVPA on MVPA-level in PE. Accordingly, no significant between-group differences were found among urban and rural school children in level of MVPA in PE, which is inconsistent with our hypothesis. Moore, Brinkley, Crawford, Evenson and Brownson (2013) on the other hand, found in their study that urban children had a higher objectively measured MVPA than their rural counterpart (30). However, studies investigating rural and urban differences in PA are inconsistent (30–32), and one must be careful in comparing results to past studies. Since there are no recommendations for which cut-off values are preferred when measuring PA-level in children (95), it is difficult to compare results across studies. Fan, Wen and Kowaleski-Jones (2014) reported the importance regarding utilization of different methods. Finding urban residents to be more physically active than rural residents when PA was measured objectively. Using subjective measurement on the other hand, found rural residents to be more physically active than urban residents (32). This partly explains why previous studies on urban and rural PA-differences are conflicting.

Further, our results indicate that Moderate AvgMVPA-group possessed a slightly higher level of MVPA in PE than High AvgMVPA-group. However, the difference was not statistically significant. We would expect High AvgMVPA-group to be more active than Moderate AvgMVPA-group. Illustrated in Figure 10, the confidence interval for the High AvgMVPA-group is wide, which tells us that the dispersion is high and the conclusion is less certain. Most likely this is due to the small sample size, whereas a larger sample may have displayed different results, and we could have been more confident about the results. The major finding in the present study is the significant difference in level of MVPA in PE between Moderate AvgMVPA-group and Low AvgMVPA-group. Moderate AvgMVPA-group possessed a 74.4 % higher level of MVPA in PE than Low AvgMVPA-group. Furthermore, High AvgMVPA possessed a 63.8 % higher level of MVPA in PE than Low AvgMVPA-group. This difference was not statistically significant, but showed a clear trend. These results partly support our hypothesis that children who possess most MVPA on daily basis also have a higher level of MVPA in PE. Hence, we can question if the Norwegian Parliaments proposal to the Government requesting to secure at least one hour of PA a day for school children enrolled in 1st to 10th grade, is necessary? Further, if increased PE in schools is the best solution to increase PA-level among those who actually need to be more physically active? To supplement our findings; we know that previous research have found children`s activity level to not meet the recommended amount of PA (17), whereas the majority of children`s PA is done during school-hours (96). Despite the growing body of school-based interventions (20–24), reports reveal no increase in PA-level among Norwegian children from 2005 to present day (17). In sum, our findings support the idea of a multi-stakeholder approach rather than studies addressing only a single factor such as school-based interventions (28,29).

PE lessons have been demonstrated as the perfect arena to engage all children to be physically active. The U.S. Department of Health and Human Services have recommended children to engage in MVPA for at least 50 % of the time they spend in PE lesson (97). Still, previous studies have reported students to engage in MVPA less than 50 % of PE lesson (58–60). MVPA-level during PE lessons in our findings shows that 58.2 % of the PE in average is spent in MVPA, thus, a contrast to previous findings. Our results indicate that Low AvgMVPA-group only spent 38.8 % of PE in MVPA, which is less than the recommended threshold. Corresponding numbers for Moderate and High AvgMVPA-group were 67.2 % and 62.7 %, respectively. These findings show us that those children who are considered as least active on daily basis, also report lower level of MVPA during PE, while both Moderate and High AvgMVPA-group represent a larger portion of PE in MVPA. MVPA-level in PE could be affected by several factors. As mentioned earlier, studies indicate that the PA-level in PE increases among children if the academic competence in PA, health and lifestyle is high among the teachers (61). Thus, it is of concern that a report from Statistics Norway indicate that only 27 % of the teachers in 5th to 7th grade have professional competence (≥ 60 units) in PE (61). Accordingly, the content of PE could influence MVPA-level; the subject, mode of delivery, lesson context, class size, space and availability of equipment (12,60,98). Future studies should aim to investigate the relationship between professional competence in PE among teachers and MVPA-level during PE.

5.2 Cardiorespiratory fitness

CRF is mainly determined by PA-level (15,16). Thus, not surprisingly our results revealed a strong correlation between VO_{2peak} and AvgMVPA which support our hypothesis. Both High and Moderate AvgMVPA-group possessed a significantly higher VO_{2peak} than Low AvgMVPA-group. Furthermore, a significant between-group difference in VO_{2peak} was detected between residences. Findings indicate that rural school children possessed a higher VO_{2peak} than urban school children, albeit our results showed no difference in AvgMVPA between the groups. Originally we expected a significantly higher AvgMVPA-level among rural school children compared to urban school children. Gutin, Yin, Humphries and Barbeau (2005) found in their study that adolescents who engaged in large amounts of vigorous PA tended to have better CRF than those who did not, while moderate PA did explain a significant but smaller proportion of the variance in CRF (16). Thus, a possible explanation based on our result could be that rural school children had higher levels of vigorous PA than urban school children, hence, higher VO_{2peak}. It is assumed that VO_{2peak} reflects a more accurate picture of average PA-level among urban and rural school children than SW-measurements in our study. Since repeated measurements have not been done in our study, the likelihood of type-2 error in SW-data is significant. Hence, based on VO_{2peak}-measurements we can assume rural school children to be more physically active than their urban counterpart.

5.3 Urban and rural built environment

The built environment describes the land use, design features and transportation system providing opportunities for travel and PA. This includes structures such as homes, schools, public spaces and parks, transportation and walkability, as well as population density, commuting distance and activity provision (99).

Previous research has found transport to and from school as an important segment of the day where children can engage in PA (100). In many rural districts, active transport to and from schools could be difficult due to the long travel distance (99). Sluijs et al. (2009) found that children who regularly choose an active transport to school are more active during the week than those travelling by car (100). In our results, almost 100 % of the urban school children walked and/or biked to and from school. Among the rural school children 73.9 %

walked and/or biked to and from school, while 26.1 % travelled by bus or car. Yet, there is no difference between AvgMVPA between urban and rural school children in our results. What Sluijs et al. (2009) did not take into consideration were the possible confounders affecting their data. Children who chose an active travel to school, may also have been more active through participation in sports. While children who travelled by car were in general less active as they were not fond of being physically active. As mentioned earlier we could assume that rural school children are more physically active than urban school children based on VO_{2peak}-measurements. Also, even though a higher percentage of urban school children walked and/or biked to and from school in comparison to rural school children, the distance to and from school could have possibly been a decisive factor. A higher percentage of the rural school children had a longer distance to travel to school than the urban school children. It is important to note that even though a larger proportion of the rural school children reported to have a longer distance to school, it was not of our knowledge how many of those children actually had an active transport to school or not. Regardless, the distance to and from school could be an underlying cause of a higher level of PA.

The home environment, as well as surrounding neighbourhood could have an important potential impact on PA. This includes accessibility to play areas, traffic danger, yards, sporting venues or recreation facilities (99,101). Our results indicate that 91.3 % of the rural school children lived in a single family house, while the corresponding numbers for urban school children were 25 %. Among the urban school children 63.3 % lived in a row house, compared with only 4.4 % of the rural school children. Basing PA-level on VO_{2peak}-measurements, we could assume that generally rural school children had more activity opportunities outside their house with larger yards or a forest nearby. Additionally, the distance to nearby living friends could have been further for rural school children than for urban school children, leading to a possible assumption of an increased amount of active transport. Furthermore, even though the highest proportion of urban school children lived in a row house, there may have been a wide range of recreational facilities nearby. In general, the urban environment is known to have an infrastructure more emphasized for increasing active transport and average PA. This includes sidewalks, bike lanes, parks and playgrounds (99). With this knowledge in mind, our results seemed unaffected to this extent.

Type of sport could also influence the VO_{2peak} - results (102). Individuals participating in endurance sports tend to have an average higher VO_{2max} than individuals participating in team sports such as soccer (103). A greater percentage share amongst both urban and rural school children attended organized sports, 81.8 % and 82.6 % respectively. Thus, a possible cause to the difference in measured VO_{2peak} could be the type of sports the subjects attended, assuming a possible higher participating share in endurance sports such as cross-country skiing, cycling and orienteering among the rural children in comparison to the urban children. Since we do not have knowledge of which types of sports the children attended, we are unable to draw any conclusion.

To our knowledge, no research has been conducted investigating urban and rural built environments in regards to PA among Norwegian children. Investigating the importance of built environment could assist in understanding the lack of PA among children and adolescents and aid in informing future public health initiatives to influence PA.

5.4 Study limitations

The present study used a cross-sectional design, which could challenge the investigation of making causal inferences because it is only able to capture a snapshot of the reality. Thus, the use of alternative time frame could have yielded different results; e.g. seasonal changes. The current pilot study has shown to be highly sensible to extreme measurements because limited sample size might influence the opportunity to draw any clear conclusions. Accordingly, there was a lack of heterogeneity in the study subjects in regard to ethnicity, which limits the generalisability of our findings across countries. A dropout rate of 11.8 % could be assumed crucial when the sample size was considered low. This could have affected the data in a way that children with low activity level chose not to participate in the study, which may have contributed to higher AvgMVPA. Albeit, with 68 enrolled participants in the study, we retrieved SW-data from only 43 participants, which is considered as a limitation by the author. The reason behind this is lack of time due to a delay in approval of the project from Regional Committees for Medical and Health Research Ethics and poor access to equipment.

Moreover, accelerometer measures have certain limitations. Since SW is not water-resistant, activities such as swimming could not be recorded. Additionally, SW cannot distinguish whether a person is carrying any weight or not, or record activities such as cycling (32,104). Furthermore, self-reported measures through HEVAS questionnaire may be biased; e.g. incorrectly interpretation of the questions or under/overestimation of distance to and from school. Finally, we did not consider other types of school-based PA such as recess and lunch breaks, which could be considered as a limitation.

5.5 Conclusion

The present study demonstrates that there is no difference in objectively measured AvgMVPA between urban and rural school children. However, a significant difference was detected between residences in VO_{2peak}, favouring rural school children. Since accelerometer measurements were not repeated several times, it is assumed that CPET-measurements draw a more accurate picture of the differences in PA-level between urban and rural school children. Furthermore, Moderate AvgMVPA-group possessed a significantly higher level of MVPA in PE than Low AvgMVPA-groups. Additionally, High AvgMVPA-group possessed a 66.7 % higher level of MVPA in PE than the Low AvgMVPA-group. The difference was not statistically significant, but showed a clear trend. Not surprisingly, our results also showed a strong correlation between VO_{2peak} and AvgMVPA. Both High and Moderate AvgMVPA-group possessed a significantly higher VO_{2peak} than Low AvgMVPA-group. These results contribute to the understanding of whether schools as a single factor to counteract the lack of PA among children, is the optimal solution or not. PA seems to be a complex behaviour affected by multiple factors, and more research is necessary to determine the most effective intervention. A multifaceted approach focusing on implementations around school, family, and community could provide a more meaningful contribution and may be a better solution to increase PA-level.

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List of appendixes

Appendix 1: Information sheet and written informed consent for the parents

NTNU

Kunnskap for en bedre verden

FORESPØRSEL OM DELTAKELSE I FORSKNINGSPROSJEKTET

HVORDAN PÅVIRKER FYSISK AKTIVITET UTØVD I – OG UTENFOR SKOLEN PÅ BARNAS FYSISKE FORM OG HELSE?

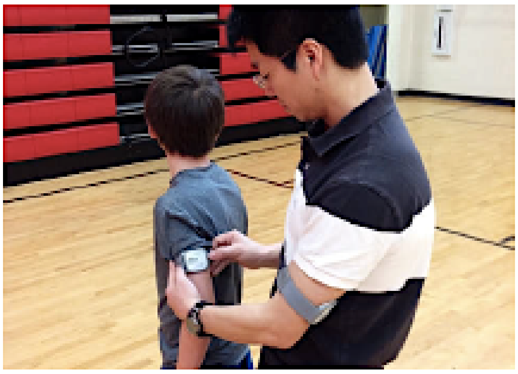
Dette er en forespørsel om tillatelse for at ditt barn kan delta i et forskningsprosjekt for å undersøke om det er en sammenheng mellom aktiviteten barnet ditt utfører i - og utenfor skolen og dens fysiske form, samt helse. Vi ønsker å undersøke hvilket tidspunkt av døgnet han/hun er mest aktivt? Om det er noen sammenheng mellom ditt barns daglige aktivitetsnivå og deltagelse i kroppsøving? Dette ønsker vi å sammenligne på tvers av skolelokasjon – by og land. Testing og undersøkelser vil hovedsakelig bli gjennomført ved det medisinske fakultet ved NTNU i Trondheim, samt ved ditt barns skole.

HVA INNEBÆRER PROSJEKTET?

Hvis ditt barn ønsker å delta, samt du som foresatt godkjenner til deltakelse - og deres skole blir valgt ut til å delta, vil ditt barn første og fremst gjennomføre en test av utholdenhet (VO2-maks test) på tredemølle. Barnet blir utstyrt med en maske som illustrert på bildet, samt pulsbelte som vil gi oss de verdiene vi trenger for å beregne barnets fysiske form. Barnet vil gjennomføre enten testen løpende eller gående på tredemøllen – alt ettersom hva barnet er kapabel til. På forhånd av testen, vil testpersonell gjennomgå hvordan tredemøllen fungerer og hvordan testen utføres - og det vil bli muligheter for at du som forelder og ditt barn kan stille spørsmål. Testen på tredemøllen krever også at vi måler barnets vekt, høyde, i tillegg til midjeomkrets. Vi kommer også til å måle hvor fysisk aktiv barnet er i løpet av en uke.

Illustrasjonsbilde: Testing av oksygenopptak på tredemølle.

Dette måles ved at barnet ditt får utdelt et armbånd, enten MioSlice eller SenseWear, som skal brukes sammenhengende i syv dager – det vil si døgnet rundt, også på natten. MioSlice er vannavstøtende og skal dermed brukes under dusjing og andre vann-aktiviteter. SenseWear er ikke vannavstøtende og skal dermed tas av under dusjing og andre vann-aktiviteter. Begge armbånd er designet for å skape minst mulig ubehag og irritasjon for de som bruker dem. I tillegg ønsker vi å ta blodprøver og blodtrykk av ditt barn. Barnet vil bli på forhånd av blodprøvetakingen bli utstyrt med et bedøvelsesplaster, som vil gi midlertidig følelsesløshet i området blodprøven skal tas.



Illustrasjonsbilde: Bruk av SenseWear.

Side 1 / 5

Barnet ditt vil også få utdelt et spørreskjema som kan besvares i samhandling med deg som foreldre. Spørreskjemaet omhandler spørsmål om blant annet fysisk aktivitet, skjermbruk og livskvalitet. Utenom bruk av MioSlice eller SenseWear, vil omtrent tidsbruk for innsamling av data vil være på 2 timer - ekskludert eventuell reising.

I prosjektet vil vi innhente og registrere opplysninger om ditt barn. Oppsummert vil dette innebære oksygenopptak, blodprøver, blodtrykk, høyde, impedansvekt, midjeomkrets, fysisk aktivitetsnivå og spørreskjemaopplysninger.

Illustrasjonsbilde: Spørreskjema.

MULIGE FORDELER OG ULEMPER

Fordelen med dette prosjektet er at barnet ditt får muligheten til å delta i et forskningsprosjekt som kan bidra til å gi viktig og nyttig informasjon. I tillegg vil forskningsprosjektet gi et innblikk i ditt barns aktivitetsnivå og fysiske form.

Ulemper er at man blir sliten rett etter den fysiske testen på tredemøllen. I tillegg kan barnet oppleve ubehag ved blodprøvetaking - men som nevnt, vil det bli gitt ut bedøvelsesplaster på forhånd. Alle testene kan ta litt tid, så man må regne med at noen timer fra skolen eller fritiden blir brukt i denne sammenhengen.

Illustrasjonsbilde: Bruk av MiloSlice.

FRIVILLIG DELTAKELSE OG MULIGHET FOR Å TREKKE SITT SAMTYKKE

Det er frivillig å delta i prosjektet. Dersom barnet ditt ønsker å delta, undertegner du samtykkeerklæringen på siste side. Barnet ditt kan velge å si nei til å delta i forskningsprosjektet, selv om du som foresatt samtykker i at barnet ditt skal delta. Du kan når som helst og uten å oppgi noen grunn trekke ditt samtykke. Dersom barnet trekker seg fra prosjektet, kan dere kreve å få slettet innsamlede prøver og opplysninger, med mindre opplysningene allerede er inngått i analyser eller brukt i vitenskapelige publikasjoner. Dersom barnet ditt senere ønsker å trekke seg eller har spørsmål til prosjektet, kan du kontakte masterstudenter Lisa Busklein Brodal på følgende telefonnummer: + 47 452 76 546, e-mail: lisabb@ntnu.no og Guro Rosvold på følgende telefonnummer: + 47 452 18 642, email: guroros@ntnu.no, eller kontakte lederen av prosjektet Dr. Arnt Erik Tjønna på følgende telefonnummer: + 47 419 27 885, e-mail: arnt.e.tjonna@ntnu.no.

Illustrasjonsbilde: Bruk av bedøvelsesplaster.

HVA SKJER MED INFORMASJONEN OM DITT BARN?

Informasjonen som registreres om ditt barn skal kun brukes slik som beskrevet i hensikten med studien. Du og ditt barn har rett til innsyn i hvilke opplysninger som er registrert om ditt barn og rett til å få korrigert eventuelle feil i de opplysningene som er registrert. Dere har også rett til å få innsyn i sikkerhetstiltakene ved behandling av opplysningene.

Illustrasjonsbilde: Måling av blodtrykk.

Alle opplysningene vil bli behandlet uten navn og fødselsnummer eller andre direkte gjenkjennende opplysninger, bortsett fra ved blodprøvetaking da dette skal sendes til klinisk kjemi, men det vil ikke bli lagret noe hos oss. En kode knytter ditt barn til dine opplysninger gjennom en navneliste. Det er kun Dr. Arnt Erik Tjønna, Lisa Busklein Brodal og Guro Rosvold som har tilgang til denne listen.

Prosjektleder har ansvar for den daglige driften av forskningsprosjektet og at opplysninger om ditt barn blir behandlet på en sikker måte. Informasjon om ditt barn vil bli anonymisert eller slettet senest 5 år etter prosjektslutt.

HVA SKJER MED PRØVER SOM BLIR TATT AV DITT BARN?

Blodprøvene som tas av ditt barn skal analyseres direkte og blir deretter destruert, så det skal ikke oppbevares i noe biobank.

FORSIKRING

Deltakere i studien vil være forsikret gjennom pasientskadeerstatningsordningen (pasientskadeloven).

ØKONOMI

Ingen etiske eller praktiske utfordringer er knyttet til økonomi. Studien er finansiert gjennom egne forskningsmidler.

GODKJENNING

Prosjektet er godkjent av Regional komite for medisinsk og helsefaglig forskningsetikk, [2018/950].

Etter ny personopplysningslov har behandlingsansvarlig [Norges Teknisk Naturvitenskaplige Universitet] og prosjektleder Dr. Arnt Erik Tjønna har et selvstendig ansvar for å sikre at behandlingen av dine opplysninger har et lovlig grunnlag. Dette prosjektet har rettslig grunnlag i EUs personvernforordning artikkel 7a.

Du har rett til å klage på behandlingen av dine opplysninger til Datatilsynet.

KONTAKTOPPLYSNINGER

Dersom du har spørsmål til prosjektet kan du ta kontakt med masterstudenter Lisa Busklein Brodal på følgende telefonnummer: + 47 452 76 546, e-mail: lisabb@ntnu.no og Guro Rosvold på følgende telefonnummer: + 47 452 18 642, email: guroros@ntnu.no, eller kontakte lederen av prosjektet Dr. Arnt Erik Tjønna på følgende telefonnummer: + 47 419 27 885, e-mail: arnt.e.tjonna@ntnu.no.

Du kan ta kontakt med institusjonens personvernombud dersom du har spørsmål om behandlingen av dine personopplysninger i prosjektet. [Thomas Helgesen, 93079038, thomas.helgesen@ntnu.no.]

SAMTYKKE TIL DELTAKELSE I PROSJEKTET

SOM FORESATT ER JEG VILLIG TIL AT BARNET MITT SKAL DELTA I PROSJEKTET

Som foresatte til_____________________(Fullt navn) samtykker vi til at hun/han kan delta i prosjektet

Sted og dato	Foresattes signatur
	Foresattes navn med trykte bokstaver

Sted og dato	Foresattes signatur
	Foresattes navn med trykte bokstaver

Som nærmeste pårørende til _____________________(Fullt navn) samtykker jeg til at hun/han kan delta i prosjektet.

Sted og dato	Pårørendes signatur
	Pårørendes navn med trykte bokstaver

Jeg bekrefter å ha gitt informasjon om prosjektet

Sted og dato	Signatur
	Rolle i prosjektet

Appendix 2: Information sheet for the child

NTNU
Kunnskap for en bedre verden

HVORDAN PÅVIRKER FYSISK AKTIVITET UTØVD I – OG UTENFOR SKOLEN PÅ BARNAS FYSISKE FORM OG HELSE?

BAKGRUNN OG HENSIKT

Vi ønsker å finne ut om det er en sammenheng mellom aktiviteten du gjør i – og utenfor skolen, på din fysiske form (det vil si evnen du har til å utføre aktiviteten du gjør) og din helse. Når på dagen er du mest aktiv? Er aktiviteten du gjør i kroppsøvingstimene betydningsfullt? Dette er vi interessert i å undersøke – både til deg som går på skole i byen og på landet. Fysisk aktivitet er viktig for alle og spesielt viktig for deg som er i stadig vekst. Ved å delta i denne helseundersøkelsen kan vi få et bedre innblikk i akkurat hvordan din aktivitet gjennom dagen påvirker din fysiske form og helse.

HVA INNEBÆRER STUDIEN?

Hvis du har lyst til å være med i denne studien og blir valgt ut til å delta, vil vi først og fremst teste kondisjonen din på tredemølle ved bruk av en maske som måler hvor mye du puster ut og inn. Testen kan både gjennomføres gående og løpende på tredemøllen med denne masken på. I tillegg vil du få tildelt et pulsbelte som måler hvor mange ganger hjertet ditt slår i løpet av ett minutt. Beltet blir festet under brystet ditt. Dette er en test av oksygenopptaket ditt, også kalt VO_2-maks test, som sier noe om din fysiske form. På forhånd vil vi gå gjennom nøye med deg hvordan en tredemølle fungerer og hvordan testen gjøres - og det vil bli muligheter for at du kan stille spørsmål. Testen på tredemøllen krever også at vi må få måle vekten - og høyden din, i tillegg til omkretsen rundt midjen.

Vi kommer også til å måle hvor fysisk aktiv du er i løpet av en uke. Dette gjøres ved at du får utdelt et armbånd, enten et som heter MioSlice eller et som heter SenseWear, eller begge to. Disse armbåndene skal brukes sammenhengende i 7 dager – det vil si, døgnet rundt, dag og natt, i en uke. MioSlice er et armbånd som tåler vann og kan dermed brukes når man for eksempel dusjer eller svømmer. SenseWear er ikke vanntett og må tas av under dusjing eller andre vann-aktiviteter. Begge armbåndene skal brukes når du sover. Både MioSlice og SenseWear festes på hånden eller armen din, på en slik måte at det ikke skal være ubehagelig for deg å bruke de – verken på dagen eller natten.

Illustrasjonsbilde: Testing av oksygenopptak på tredemølle.

Illustrasjonsbilde: Bruk av SenseWear.

I tillegg ønsker vi å ta blodprøve av deg og måle blodtrykket ditt. Før blodprøven vil du få utdelt et bedøvelsesplaster som gjør at du mister følelsen i området blodprøven skal tas.

Du vil også bli gitt et spørreskjema som besvares med hjelp fra en foresatt. Et spørreskjema er et skjema med spørsmål vi ønsker at du skal svare på. Spørreskjemaet omhandler spørsmål om blant annet fysisk aktivitet, skjermbruk og hvordan du har det i hverdagen.

Bortsett fra bruk av MioSlice og/eller Sensewear som skal brukes hver dag i 7 dager, vil du totalt komme til å bruke omtrent 2 timer på dette - i tillegg til tiden som brukes til eventuell reising til og fra sykehuset.

Illustrasjonsbilde: Spørreskjema.

Illustrasjonsbilde: Bruk av MiloSlice.

MULIGE FORDELER OG ULEMPER

Fordelen med dette prosjektet er at du får muligheten til å delta i et forskningsprosjekt som kan bidra til å gi viktig og nyttig informasjon. I tillegg vil forskningsprosjektet gi et innblikk i ditt eget aktivitetsnivå og fysiske form.

Ulemper er at man blir sliten rett etter den fysiske testen på tredemøllen. I tillegg kan du oppleve ubehag ved blodprøvetaking - men som nevnt, vil det bli gitt ut bedøvelsesplaster på forhånd. Alle testene kan ta litt tid, så du må regne med at noen timer fra skolen eller fritiden blir brukt i denne sammenhengen.

Illustrasjonsbilde: Bruk av bedøvelsesplaster.

HVA SKJER MED PRØVENE OG INFORMASJONEN OM DEG?

Informasjonen og prøvene vi får fra deg vil bli godt tatt vare på og vil kun bli brukt i sammenheng med denne studien. All informasjon og prøver vil vi samle inn uten verken ditt navn eller fødselsnummer, bortsett fra ved blodprøvetaking da dette skal sendes til klinisk kjemi, men det vil ikke bli lagret noen plass hos oss. Det vil da si, at resultatene vi får ut av denne studien, blir umulig å spore tilbake til deg og kan ikke bli knyttet til ditt navn. En kode knytter dine opplysninger og prøver gjennom en navneliste. Det er kun spesiell personell som er med i forskningsprosjektet som vil ha adgang til denne listen og kan finne tilbake til deg. Av kontrollhensyn blir dataene samlet inn oppbevart forsvarlig nedlåst i 5 år. Etter dette vil dataene bli slettet. Det er Dr. Arnt Erik Tjønna som er ansvarlig for datamaterialet i denne perioden.

Illustrasjonsbilde: Måling av blodtrykk.

Deltakelse

Det er frivillig å delta i studien. Du kan når som helst, og uten å oppgi noen grunn, trekke deg fra prosjektet. Du kan også velge å si nei til å delta i forskningsprosjektet, selv om dine foresatte sier ja til at du skal delta. Dersom du senere ønsker å trekke deg eller har spørsmål til studien, kan du enten kontakte masterstudenter Lisa Busklein Brodal på følgende telefonnummer: + 47 452 76 546, e-mail: lisabb@ntnu.no og Guro Rosvold på følgende telefonnummer: + 47 452 18 642, email: guroros@ntnu.no, eller lederen av prosjektet Dr. Arnt Erik Tjønna på følgende telefonnummer: + 47 419 27 885, e-mail: arnt.e.tjonna@ntnu.no.

Appendix 3: Approval by the Regional Committees for Medical and Health Research Ethics

Emne: Tar reviderte informasjonsskriv til orientering
Fra: post@helseforskning.etikkom.no
Dato: 08.11.2018 11:08
Til: arnt.e.tjonna@ntnu.no
Kopi: oystein.risa@ntnu.no; rek-midt@mh.ntnu.no

Vår ref. nr.: 2018/950
Prosjekttittel: "Har mengde fysisk aktivitet utøvd i skolen og på fritiden en sammenheng med barnas fysiske form?"
Prosjektleder: Arnt Erik Tjønna

Til Arnt Erik Tjønna.

Vi viser til reviderte informasjonsskriv innsendt 05.11.2018. Komiteen tar disse til orientering, uten ytterligere merknader. Studien kan igangsettes.

Med vennlig hilsen
Marit Hovdal Moan
seniorrådgiver
post@helseforskning.etikkom.no
T: 73597504

Regional komité for medisinsk og helsefaglig forskningsetikk REK midt-Norge (REK midt)
http://helseforskning.etikkom.no

REK
REGIONALE KOMITEER FOR MEDISINSK OG HELSEFAGLIG FORSKNINGSETIKK

Appendix 4: SW instructions

Hvordan påvirker fysisk aktivitet utøvd i – og utenfor skolen barnas på fysiske form og helse?

NTNU

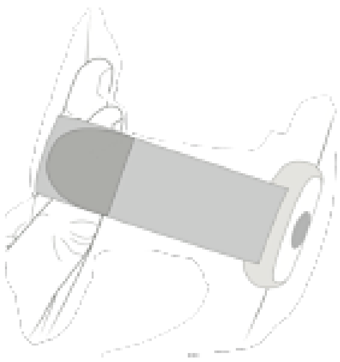
Kunnskap for en bedre verden

FutureKID – FUTURE KIDS IN DAILY ACTIVITY

ET MASTERGRADSPROSJEKT I REGI AV NTNU

INFORMASJON VEDRØRENDE AKSELEROMETERET SENSEWEAR

SenseWear skal brukes i 7 sammenhengende dager - det vil si, døgnet rundt; både når du sover og er våken. Dette båndet skal brukes på baksiden av triceps, det vil si på baksiden av overarmen på den armen du skriver med. Logoen skal peke oppover og sølvoverflaten på baksiden av armbåndet skal være i kontakt med huden din. Overflaten klokken er i kontakt med, må være ren og tørr – og uten krem og/eller olje. Armbåndet skal ikke være for stramt og du skal klare å plassere to fingre under stroppen når den er festet. Dobbeltsjekk at festet for armbåndet sitter godt fast. Når armbåndet skal fjernes, ikke fjern den ved å åpne festestroppen, men heller gli den av hånden ved å tøye strikken – det samme når den skal festes på igjen. Ellers er ikke klokken vannavstøtende, det vil si at du ikke kan bruke den når du dusjer og/eller er i kontakt med vann på andre måter – ellers brukes den som normalt.



Dersom det skulle være noe andre spørsmål, ta kontakt med prosjektansvarlige:

Mastergradsstudent Lisa Busklein Brodal

Epost: lisabb@ntnu.no

Mobil: + 47 452 76 546

Mastergradsstudent Guro Rosvold

Epost: guroros@ntnu.no

Mobil: + 47 452 18 6

Prosjektansvarlig Arnt Erik Tjønna

Epost: arnt.e.tjonna@ntnu.no

Mobil: + 47 419 27 885

Appendix 5: HEVAS questionnaire

	UNIVERSITETET I BERGEN *HEMIL-senteret* *Senter for forskning om helsefremmende arbeid, miljø og livsstil*

Helsevaner blant skoleelever.

En WHO-undersøkelse i over 40 land.

Spørreskjema for 2018

7. klassetrinn

Bokmål

Christiesgt. 13 - 5020 Bergen, Telefon: 55 58 48 43, E-post: hevas@uib.no
Etablert i samarbeid med Nasjonalforeningen for folkehelsen 1988
Samarbeidssenter for Verdens Helseorganisasjon (WHO)

Kjære elev!

Ved å svare på disse spørsmålene, vil du hjelpe oss med å finne ut mer om barn og unges livsstil og skolemiljø. De samme spørsmålene vil bli stilt til skoleelever i 40 andre land. Svarene dine skal være hemmelige, derfor skal du ikke besvare spørsmålene mens andre ser på.

Dersom du ikke ønsker å svare, kan du la være. Hvis det er noen spørsmål du ikke ønsker å svare på, kan du gå videre til neste spørsmål.

Les hvert enkelt spørsmål, og svar så ærlig som du kan.

På forhånd takk for hjelpen!

Oddrun Samdal
Professor

Ingebjørg Louise Rockwell Djupedal
Prosjektmedarbeider

Er du gutt eller jente?

(1) ❑ Gutt
(2) ❑ Jente

I hvilken måned ble du født?

(1) ❑ Januar
(2) ❑ Februar
(3) ❑ Mars
(4) ❑ April
(5) ❑ Mai
(6) ❑ Juni
(7) ❑ Juli
(8) ❑ August
(9) ❑ September
(10) ❑ Oktober
(11) ❑ November
(12) ❑ Desember

Hvilket år ble du født?

(13) ❑ 1995 eller tidligere
(1) ❑ 1996
(2) ❑ 1997
(3) ❑ 1998
(4) ❑ 1999
(5) ❑ 2000
(6) ❑ 2001
(7) ❑ 2002
(8) ❑ 2003
(9) ❑ 2004
(10) ❑ 2005
(11) ❑ 2006
(12) ❑ 2007
(14) ❑ 2008 eller senere

I hvilket land er du født?

(1) ❑ I Norge
(2) ❑ I Sverige, Finland, Danmark eller Island
(3) ❑ Annet land i Europa
(4) ❑ Annet land utenfor Europa
(5) ❑ Vet ikke

I hvilket land er din mor født?

(1) ❑ I Norge
(2) ❑ I Sverige, Finland, Danmark eller Island
(3) ❑ Annet land i Europa
(4) ❑ Annet land utenfor Europa
(5) ❑ Vet ikke

I hvilket land er din far født?

(1) ❑ I Norge
(2) ❑ I Sverige, Finland, Danmark eller Island
(3) ❑ Annet land i Europa
(4) ❑ Annet land utenfor Europa
(5) ❑ Vet ikke

Har din familie bil?

(1) ❑ Nei
(2) ❑ Ja, en
(3) ❑ Ja, to eller flere

Hvor mange ganger reiste du og familien din på ferie til utlandet i fjor?

(1) ❑ Ingen
(2) ❑ En gang
(3) ❑ To ganger
(4) ❑ Mer enn to ganger

Hvor mange PC-er har familien din?

(1) ❑ Ingen
(2) ❑ En
(3) ❑ To
(4) ❑ Flere enn to

Har familien din oppvaskmaskin hjemme?

(1) ❑ Ja
(2) ❑ Nei

Hvor bor du?

(1) ❑ I en enebolig
(2) ❑ I et rekkehus (ta også med to- eller firemannsbolig
(3) ❑ I en leilighet

Vil du si at helsen din er….?

(1) ❑ Svært god
(2) ❑ God
(3) ❑ Ganske god
(4) ❑ Dårlig

Med fysisk aktivitet mener vi aktiviteter som gjør at du en del av tiden får økt puls og blir andpusten. Fysisk aktivitet er for eksempel idrettsaktiviteter etter skolen, aktiviteter på skolen, det å leke med venner eller det å gå til skolen. Andre eksempler er å løpe, stå på skateboard, sykle, svømme, spille fotball, stå på ski/snowboard eller danse. For det neste spørsmålet, legg sammen all den tiden du var fysisk aktiv hver dag.

I løpet av de siste 7 dagene. Hvor mange av disse dagene var du fysisk aktiv i minst 60 minutter per dag?

(0) ❑ Ingen dager
(1) ❑ 1 dag
(2) ❑ 2 dager
(3) ❑ 3 dager
(4) ❑ 4 dager
(5) ❑ 5 dager
(6) ❑ 6 dager
(7) ❑ 7 dager

I ukedagene, hvor ofte spiser du vanligvis frokost (mer enn et glass melk eller juice)?

(1) ❑ Jeg spiser aldri frokost på ukedager
(2) ❑ En dag
(3) ❑ To dager
(4) ❑ Tre dager
(5) ❑ Fire dager
(6) ❑ Fem dager

I helgen, hvor ofte spiser du vanligvis frokost (mer enn et glass melk eller juice)?

(1) ❑ Jeg spiser aldri frokost i helgen

(2) ❑ Jeg spiser vanligvis frokost bare en av dagene i helgen (lørdag eller søndag)

(3) ❑ Jeg spiser vanligvis frokost begge dagene i helgen (både lørdag og søndag)

Hvor mange ganger i uken spiser eller drikker du noe av dette?

	Aldri	Sjeldnere enn en gang per uke	En gang i uken	2-4 dager i uken	5-6 dager i uken	En gang hver dag	Flere ganger hver dag
Frukt	(1) ❑	(2) ❑	(3) ❑	(4) ❑	(5) ❑	(6) ❑	(7) ❑
Grønnsaker	(1) ❑	(2) ❑	(3) ❑	(4) ❑	(5) ❑	(6) ❑	(7) ❑
Godteri (f.eks. drops sjokolade)	(1) ❑	(2) ❑	(3) ❑	(4) ❑	(5) ❑	(6) ❑	(7) ❑
Cola, brus eller andre leskedrikker med sukker	(1) ❑	(2) ❑	(3) ❑	(4) ❑	(5) ❑	(6) ❑	(7) ❑
Sukkerfri brus eller leskedrikk	(1) ❑	(2) ❑	(3) ❑	(4) ❑	(5) ❑	(6) ❑	(7) ❑

Hvor ofte spiser du til vanlig disse måltidene?

	Hver dag	4-6 dager i uka	1-3 dager i uka	Sjelden eller aldri
Frokost	(1) ❑	(2) ❑	(3) ❑	(4) ❑
Formiddagsmat/nistepakke	(1) ❑	(2) ❑	(3) ❑	(4) ❑
Middag eller brødmåltid etter skolen	(1) ❑	(2) ❑	(3) ❑	(4) ❑

Hva synes du om kroppen din? Den er:

(1) ❑ Altfor tynn

(2) ❑ Litt for tynn

(3) ❑ Omtrent passe størrelse

(4) ❑ Litt for tykk

(5) ❑ Altfor tykk

(6) ❑ Jeg tenker ikke på det

Hva er den høyeste utdanningen du har tenkt å ta?

(1) ❑ Universitet eller høyskoleutdanning av høyere grad (f.eks. master, lektor, advokat, sivilingeniør, lege)

(2) ❑ Universitet eller høyskoleutdanning av lavere grad (f.eks. bachelor, lærer, politi, sykepleier, ingeniør, journalist)

(3) ❑ Videregående skole: studiespesialisering/idrettsfag/musikk, dans og drama

(4) ❑ Videregående skole: yrkesfag

(5) ❑ Annet ______

(6) ❑ Har ikke bestemt meg

Utenom skoletid: Hvor mange GANGER i uka driver du idrett, eller mosjonerer du så mye at du blir andpusten og/eller svett?

(1) ❑ Hver dag

(2) ❑ 4-6 ganger i uka

(3) ❑ 2-3 ganger i uka

(4) ❑ En gang i uka

(5) ❑ En gang i måneden

(6) ❑ Mindre enn en gang i måneden

(7) ❑ Aldri

Utenom skoletid: Hvor mange TIMER i uka driver du idrett, eller mosjonerer du så mye at du blir andpusten og/eller svett?

(1) ❑ Ingen

(2) ❑ Omtrent 1/2 time

(3) ❑ Omtrent 1 time

(4) ❑ Omtrent 2-3 timer

(5) ❑ Omtrent 4-6 timer

(6) ❑ 7 timer eller mer

Hvor ofte deltar du vanligvis i disse typene organiserte aktiviteter på fritiden? Med organiserte aktiviteter mener vi aktiviteter som er drevet av idrettsklubber, andre klubber eller organisasjoner.

	Holder ikke på med denne aktiviteten	2-3 ganger i måneden eller sjeldnere	Omtrent 1 dag i uken	2 ganger i uken eller oftere
Organisert lagidrett (for eksempel fotball, håndball, basketball, ishockey)	(1) ❑	(2) ❑	(3) ❑	(4) ❑
Organiserte individuelle fysiske aktiviteter (for eksempel svømming, sykling, kampsport, friidrett, turn, dans, langrenn)	(1) ❑	(2) ❑	(3) ❑	(4) ❑
Organiserte musikk- og dramaaktiviteter i grupper (for eksempel korps, kor, band, teatergruppe)	(1) ❑	(2) ❑	(3) ❑	(4) ❑
Organiserte individuelle musikkaktiviteter (for eksempel spille et instrument, ta musikktimer)	(1) ❑	(2) ❑	(3) ❑	(4) ❑
Andre organiserte aktiviteter i grupper (for eksempel kirkelige aktiviteter, speider)	(1) ❑	(2) ❑	(3) ❑	(4) ❑

Hvor lang tid tar det deg vanligvis å dra hjemmefra til skolen?

(1) ❑ Mindre enn 5 minutter
(2) ❑ 5-15 minutter
(3) ❑ 15-30 minutter
(4) ❑ 30 minutter til 1 time
(5) ❑ Mer enn 1 time

På en vanlig dag er MESTEPARTEN av reisen din TIL skolen gjennomført ....?

(1) ❑ Til fots
(2) ❑ Med sykkel
(3) ❑ Med buss, trikk, T-bane, tog eller båt
(4) ❑ Med bil, motorsykkel eller moped
(5) ❑ På andre måter

På en vanlig dag er MESTEPARTEN av reisen din FRÅ skolen gjennomført ....?

(1) ❑ Til fots

(2) ❑ Med sykkel

(3) ❑ Med buss, trikk, T-bane, tog eller båt

(4) ❑ Med bil, motorsykkel eller moped

(5) ❑ På andre måter

I friminuttene: Hvor OFTE beveger du deg så mye at du blir andpusten og/eller svett?

(1) ❑ Hvert friminutt

(2) ❑ Ikke hvert friminutt, men likevel hver dag

(4) ❑ Ikke hver dag, men likevel hver uke

(3) ❑ Ikke så ofte som hver uke

(5) ❑ Aldri

Hvor mange ganger i en vanlig uke deltar du i kroppsøvingstimer? (ta også med tilvalgsfag hvor du er fysisk aktiv, f. eks. idrett, friluftsliv). En dobbeltime = 2 ganger.

(1) ❑ 0 ganger

(2) ❑ 1 gang

(3) ❑ 2 ganger

(4) ❑ 3 ganger

(5) ❑ 4 ganger

(6) ❑ Mer enn fire ganger

Hvor mange minutter i løpet av en enkel kroppsøvingstime (45 minutter) beveger du deg såpass mye at du blir varm og litt andpusten?

(1) ❑ 0 minutter

(2) ❑ 1-10 minutter

(3) ❑ 11-20 minutter

(4) ❑ 21-30 minutter

(5) ❑ Mer enn 30 minutter

Er du medlem av et idrettslag eller en idrettsklubb?

(1) ❑ Nei

(2) ❑ Ja, jeg trener i idrettslaget

(3) ❑ Ja, men jeg er ikke med på treninger

I en vanlig uke, hvor mange dager er du fysisk aktiv i 60 minutter i løpet av skoletiden (i skoletimene, kroppsøving, friminutt, storefri) slik at du får økt puls og blir andpusten en del av tiden?

(0) ❑ 0 dager
(1) ❑ 1
(2) ❑ 2
(3) ❑ 3
(4) ❑ 4
(5) ❑ 5 dager

Nedenfor står noen påstander om hva du tenker om å gå på skolen. Sett ett kryss for hver påstand.

	Helt enig	Enig	Verken enig eller uenig	Uenig	Helt uenig
Jeg gleder meg til å gå på skolen.	(1) ❑	(2) ❑	(3) ❑	(4) ❑	(5) ❑
Jeg liker å gå på skolen.	(1) ❑	(2) ❑	(3) ❑	(4) ❑	(5) ❑
Jeg har det gøy på skolen.	(1) ❑	(2) ❑	(3) ❑	(4) ❑	(5) ❑
Det vi lærer i timene er interessant.	(1) ❑	(2) ❑	(3) ❑	(4) ❑	(5) ❑
Jeg liker det vi gjør på skolen.	(1) ❑	(2) ❑	(3) ❑	(4) ❑	(5) ❑

Nedenfor står noen påstander om dine lærere. Sett ett kryss for hver påstand.

	Helt enig	Enig	Verken enig eller uenig	Uenig	Helt uenig
Jeg føler at lærerne mine godtar meg som jeg er.	(1) ❑	(2) ❑	(3) ❑	(4) ❑	(5) ❑
Jeg har stor tillit til lærerne mine.	(1) ❑	(2) ❑	(3) ❑	(4) ❑	(5) ❑
Jeg føler at lærerne mine bryr seg om meg som person.	(1) ❑	(2) ❑	(3) ❑	(4) ❑	(5) ❑

TAKK FOR HJELPEN!

NTNU
Norwegian University of
Science and Technology