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PHYSICAL ACTIVITY AND QUALITY OF LIFE IN CZECH ADULT POPULATION

Diplomová práce

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Abstrakt:

Pohybová aktivita je všeobecně uznávána jako nefarmakologický přístup k udržení dobrého zdraví. Proto je velmi důležité sledovat a popisovat úroveň pohybové aktivity v rámci populace, a to i v České republice.

Cílem této práce bylo zhodnotit úroveň pohybové aktivity a její vliv na kvalitu života dospělé populace v České republice.

Výzkumu se zúčastnilo celkem 1586 dospělých osob (55,9 % žen) ve věku od 24 do 60 let a více. Úroveň pohybové aktivity byla objektivně hodnocena pomocí krokoměrů, data o sebehodnocení pohybové aktivity a pěší dostupnosti (walkability) okolí místa bydliště byla získána prostřednictvím dotazníku NEWS-A. Data byla zpracována v programu Statistica verze 14.

Výsledky ukázaly, že přibližně 41,1 % dospělých Čechů splňuje doporučení pro dosažení 10 000 kroků denně. Současně však 76,9 % českých dospělých splňovalo doporučenou hodnotu více než 3000 MET-minut/týden, což svědčí o nadhodnocování úrovně pohybové aktivity v dotazníkovém šetření. Muži vykazovali signifikantně vyšší úroveň pohybové aktivity než ženy, což bylo zjištěno jak objektivním (47,2 % vs. 36,3 %), tak subjektivním monitorováním (78,8 % vs. 75,3 %).

Práce poukazuje na důležitost řešení nízké úrovně pohybové aktivity dospělých v České republice. Strategie, které se zaměřují na zlepšení zastavěného prostředí, zejména podporou pěší dostupnosti, mohou hrát klíčovou roli při podpoře vyšší úrovně pohybové aktivity. V konečném důsledku může toto úsilí vést ke zlepšení kvality života jednotlivců v těchto komunitách.

Klíčová slova:

kvalita života, prostředí, dospělá populace, pohybová aktivita, INDARES, IPEN, kroky

Souhlasím s půjčováním práce v rámci knihovních služeb.

Bibliographical identification

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Abstract:

Physical activity is widely recognized as a nonpharmaceutical approach to maintaining good health. Therefore, it is crucial to monitor and describe the levels of physical activity within populations, including the Czech Republic.

The aim of this thesis was to assess the physical activity levels and their effects on the quality of life of adults in the Czech Republic.

A total of 1586 adults (55.9% females) aged 24 to 60 and above, participated in the study. Physical activity levels were objectively assessed using pedometers, while self-reported data on physical activity and neighborhood walkability were obtained through the NEWS-A questionnaire.

The findings revealed that approximately 41.1% of Czech adults met the recommended guidelines of achieving 10,000 steps per day. At the same time, around 76.9% of Czech adults met the guidelines of more than 3000 MET-minutes/week, indicating a high overestimation of physical activity in self-reported data. Males exhibited significantly higher levels of physical activity compared to females, as observed in both objective (47.2% vs. 36.3%) and self-reported monitoring methods (78.8% vs. 75.3%).

The study highlights the importance of addressing the low levels of physical activity among adults in the Czech Republic. Strategies that focus on improving the built environment, particularly by promoting walkability, can play a pivotal role in encouraging higher levels of physical activity. Ultimately, these efforts can lead to improvements in the quality of life for individuals in these communities.

Keywords:

quality of life, environment, adults, physical activity, INDARES, IPEN, steps

Prohlašuji, že jsem tuto práci zpracoval samostatně pod vedením prof. Mgr. Josefa Mitáše, Ph.D., uvedl všechny použité literární a odborné zdroje a dodržoval zásady vědecké etiky.

V Olomouci dne 30. června 2023

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I would like to thank my thesis supervisor prof. Mgr. Josef Mitáš, Ph.D. for his help and valuable advice that he provided me during the preparation of this thesis.

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1 INTRODUCTION

In today's world, there is a universal desire for a high quality of life, encompassing various aspects such as social well-being, economic stability, physical health, environmental sustainability, emotional balance, and adaptability to change. This becomes increasingly crucial during adulthood, typically between the ages of 20 and 60 and beyond, as individuals face numerous challenges related to work, education, and family. To maintain dignity, regain control over their lives, and nurture a sense of self-worth, it is imperative to provide proper interventions that address these needs.

The quality of life of adults has become a pressing concern in many countries, including the Czech Republic, where the adult population plays a vital role in national development. This is especially significant for the Czech Republic, which recently gained independence from Soviet control. The country faces several challenges, including promoting active lifestyles, ensuring access to high-quality healthcare and social services, and addressing environmental issues and physical inactivity, which directly impact the quality of life for adults (Sigmundová, 2011).

To tackle these issues effectively, there is a growing need to monitor and understand the patterns of physical activity over time. This data is essential for developing impactful health promotion programs that target specific populations (Bandosz et al., 2012).

Numerous studies have emphasized the importance of managing different domains that contribute to adults' quality of life. However, it is crucial to gain a deeper understanding of the complex relationship between the environment, physical activity levels (measured by step counts per day or week), and the quality of life among adults in the Czech Republic. This understanding becomes even more relevant when considering the need to prevent unhealthy behaviors and implement policy changes.

Therefore, this study aims to investigate how the environment influences physical activity levels, as observed through daily and weekly step counts, and how this impact translates to the quality of life among adults in the Czech Republic. The findings of this study will contribute valuable insights to the existing knowledge base on physical activity and its role in promoting health and well-being.

It is worth noting that the observation of physical activity is now even more relevant due to the pressing need to address unhealthy behaviors and implement policy changes. By understanding the relationship between physical activity, unhealthy behaviors, and policy interventions, we can develop more effective strategies to promote a healthier lifestyle and improve the overall quality of life for adults.

Considering this, it is essential to consider current needs and priorities when examining physical activity patterns and their effects. By doing so, we can inform evidence-based policies and interventions that empower individuals to make positive lifestyle changes and create environments that support and promote physical activity.

2 BACKGROUND

2.1 Quality of life

The concept of 'quality of life' was initially introduced by A. C. Pigou in his book on economic well-being in 1920 (Ruževičius, 2014). However, it received little attention and was largely ignored until the end of World War II. It was during this time that the World Health Organization (WHO) expanded the definition of health to include physical, psychological, and social well-being. The WHO defines quality of life (QOL) as the individual's perception of their life in relation to their goals, aspirations, living standards, and interests, shaped by their cultural and value system (Ruževičius, 2014).

While quality of life does not have a single determinant, the WHO's definition is generally used as a guideline (Akranavičiūtė, 2007). However, various studies have proposed different determinants of quality of life. For instance, Furmonavičius (2001) defines quality of life based on an individual's cultural values and their pursuit of goals, living standards, and interests. Akranavičiūtė (2007) emphasizes that quality of life is influenced by factors such as physical and mental health, level of independence, social relationships, and the environment.

Moreover, Eurostat (2017) considers both objective factors (such as material resources, health, work status, and living conditions) and the subjective perception an individual has of them when describing quality of life. This suggests that multiple factors, including levels of physical activity, impact quality of life. Various approaches and assessment methods have been employed to investigate quality of life, as highlighted in the study by Alves (2020).

Many studies have examined the influence of physical activity levels on the quality of life among adult populations, considering a range of variables. For example, some studies have explored the relationship between quality of life and chronic diseases, physical health, socioeconomic factors, environmental factors, and autonomy. Lima et al. (2009) conducted a study on quality of life in adults with chronic diseases, revealing that individuals with chronic conditions tend to have poorer quality of life, particularly if they lack access to adequate healthcare resources within their community and family. In a similar way, Ghimire et al. (2017) found that adults with hypertension who face demands from large families experience stress and a lower quality of life. There is evidence to suggest that even moderate levels of physical activity, including steps taken, can positively affect quality of life for adults, irrespective of age (Acree, 2006; Lee, et al 2008). Therefore, it would be prudent to know the description of physical activity levels of Czech adults in the contest of average daily and weekly steps that have the potential to improve health and quality of life. This could guide policy makers and health promotion organizers to make the appropriate decisions to increase physical activity levels of Czech adults.

2.2 Physical activity and quality of life in the Czech adults

The World Health Organization (WHO) defines physical activity as any bodily movement produced by skeletal muscles that requires energy expenditure. It encompasses all types of movement, including leisure activities, transportation, and work-related tasks such as walking (World Health Organization, 2021). Both moderate- and vigorous-intensity physical activities have been shown to improve overall health.

The European Commission and the World Health Organization (2018) highlight that physical activity can occur in various settings, including during transportation, leisure activities, school, workplace, and daily living at home. However, maintaining sufficient levels of physical activity has become increasingly challenging as modern population have become more sedentary.

Many studies have demonstrated the undeniable benefits of physical activity for individuals of all ages, including older adults, with recommendations for participation to improve quality of life. Engaging in regular physical activity has been found to aid in the prevention and management of noncommunicable diseases such as heart disease, stroke, diabetes, and certain types of cancers, while also helping to lower blood pressure, maintain a healthy weight, and enhance mental clarity, well-being, and quality of life (World Health Organization, 2022).

In addition to aerobic physical activity, Bull et al. (2020) suggest that engaging in muscle-strengthening activities at moderate or greater intensity for at least two days per week provides additional health benefits. A study conducted by Lamberts and Pauwels (2006), which measured average life satisfaction in selected European countries on a 10-point scale, placed the Czech Republic in the 18th position. While the study did not consider age-specific factors, it suggests that the quality of life in the Czech Republic is relatively lower compared to some other European countries.

There is an indication that the government of the Czech Republic is concerned about the quality of life of adults. For instance, in 2013, the Czech Republic Ministry of Labor and Social Affairs developed the National Action Plan to promote healthy aging and provide social and healthcare services for adults (Sowa-Kofta, 2017).

Regarding the level of physical activity in the Czech population, a study by Hamrik et al. (2014) classified the population into high, moderate, or low levels based on the number of MET-minutes per week. The findings revealed that 32.3% of adults reported a low level of physical activity, 21.3% reported a moderate level, and 46.4% reported a high level. However, the level of physical activity tends to decrease with age, with over 60% of adults in all age categories classified as sedentary. Older adults, particularly those over 65 years old, exhibited the highest rate of sedentary behavior (Hamrik et al., 2014).

Similarly, Mitáš and Frömel (2021) examined the level of physical activity in the Czech population across different regions and found that the weekly physical activity level of adults in the Czech Republic is influenced by the size of the community, with smaller communities exhibiting higher rates of physical activity. This trend is observed in both men and women and can be considered a specificity of physical activity within the Czech population. The study indicated that women have an average of more than 5000 MET-min/week, while men have more than 6000 MET-min/week. Overall, physical activity levels across all regions of the Czech Republic appear to be balanced (Mitáš and Frömel, 2021).

A study conducted by Mitáš et al. (2013) within the Czech Republic emphasized the importance of connecting multiple sectors that impact the lifestyle of the general population. They recommended adopting an interdisciplinary approach to evaluate the fundamental environmental factors that influence the level of physical activity, including walkability, socioeconomic status, participation in organized and voluntary physical activities, neighborhood safety, type of transportation, and the size of the community.

In a study by Bassett et al. (2008), which examined the associations between walking, bicycling, public transportation, and obesity rates in Europe, North America, and Australia, it was revealed that European countries, including the Czech Republic, had high rates of walking and bicycling. Countries with higher rates of active transportation tend to have lower obesity rates. However, this finding seems to contradict the results of a study by Pelclová et al. (2016), which indicated an increasing proportion of inactive lifestyles among adults in the Czech Republic, with almost two-thirds of the Czech adult population being insufficiently active.

While many studies have described and explored the levels of physical activity and its influence on the quality of life of older adults in the Czech Republic, similar descriptions should be applied to the adult population.

2.3 Monitoring of physical activity using the step counters

Kang et al. (2009) mentioned that the concept of "10,000 steps per day" originated in Japan with the development of the electronic pedometer known as "manpo-kei." It gained popularity through walking clubs and media promotion. This goal of 10,000 steps per day has been widely adopted and shown to have positive effects on health and quality of life (Tudor-Locke & Bassett, 2004). Various organizations, including the Centers for Disease Control and Prevention, the American College of Sports Medicine (Pate et al., 1995), and World Health Organization (2008), recommend 10,000 steps per day as a target for physical activity to improve health and quality of life.

Obesity and a sedentary lifestyle are closely related, as highlighted by Qi et al. (2012). Their study found that excessive television watching was associated with an increased genetic propensity for obesity. Conversely, regular and brisk walking for an hour each day had a beneficial effect in preventing obesity and positively impacting the quality of life of adults.

In the Czech Republic, a study conducted by Sigmundová (2013) focused on university students and their physical activity levels, specifically the number of steps taken. The findings revealed that approximately two-thirds of the students, both females and males, were able to achieve 10,000 steps on four or more days per week. This suggests an improvement in their physical health and a potential positive impact on their quality of life. Tudor-Locke (2001) also supports the idea that 10,000 steps per day is a reasonable estimate of daily physical activity for healthy adults. Additionally, Tudor-Locke (2013) developed a step-defined index that categorizes sedentary lifestyle and physical activity levels based on the number of steps taken per day, providing insights into daily energy expenditure and overall activity levels.

Multiple studies provide strong evidence that meeting the recommended number of steps per day can improve fitness, physical health, and reduce the risk of non-communicable diseases. For example, Welk et al. (2000) found that individuals who recorded at least 30 minutes of moderate activity on a specific day also achieved at least 10,000 steps on that same day, demonstrating the positive impact on health and quality of life. These findings collectively highlight the importance of regular physical activity, such as achieving 10,000 steps per day, in improving overall well-being and enhancing the quality of life for adults.

Lee and Buchner (2008) emphasize the importance of brisk walking, which is recommended by the American College of Sports Medicine (ACSM) as a form of moderate-intensity activity. Brisk walking typically involves walking at a pace of 3 to 4 mph and is considered sufficient for most adults to achieve substantial health benefits. The recommendation includes a minimum frequency of walking on most days of the week (usually interpreted as at least 5 days per week) and a minimum duration of 30 minutes per day.

To assess physical activity levels and walking patterns more accurately, Stewart (2001) suggests the use of pedometers and accelerometers. These devices provide more precise measurements of walking activity.

It is important for individuals to understand the intensity levels of different types of walking. Lee and Buchner (2008) point out that walking can be performed at light intensity (e.g., leisurely strolling while window shopping), moderate intensity, or, less commonly, vigorous intensity (e.g., fast walking on an incline). Adults may not always be aware of which types of walking qualify as moderate to vigorous intensity and meet the recommendation, or which types are considered light intensity and do not meet the recommendation.

Brisk walking has been identified as the most effective form of exercise for increasing physical activity among adults (Hillsdon, 1996). It is also the most frequently reported form of exercise among adults (Bromley, 2005). Brisk walking can be easily incorporated into daily routines, is accessible to almost everyone, and carries a low risk of injury (Morris, 1997). Research has shown that self-determined brisk walking for at least 30 minutes a day, even in shorter increments of 10 minutes, can provide moderate physical activity at the intensity required to achieve health benefits (Murtagh et al., 2002). This includes everyday activities like walking a dog.

Furthermore, Tully (2007) suggests that walking interventions can be effective in reducing body weight, body mass index (BMI), waist and hip circumference, body fat, blood pressure, and the cholesterol-HDL ratio. Walking interventions may also have a positive impact on mood and quality of life.

In a study conducted in eight cities in the Czech Republic, Sigmundová (2011) used pedometers to assess physical activity levels. The study found that more than half of the participants had adequate levels of physical activity for maintaining health. However, the study also observed a decline in organized physical activity as participants aged. To compensate for this decline, increasing the daily step count could be an effective strategy to improve health, especially in an environment that supports physical activity, such as a pleasant neighborhood with easy access to shops.

2.4 Physical activity recommendations

According to the Czech Republic Physical Activity Factsheet, there is a draft action plan in place to promote physical activity in the country. The recommendations for adults and older adults in the action plan are based on the World Health Organization's Global recommendations on physical activity and sedentary behavior (World Health Organization, 2020), as well as the guidelines on physical activity from the European Union and Canada. The World Health Organization recommends achieving 600 MET (Metabolic Equivalent of Task) minutes of physical activity per week, which is equivalent to 150 minutes of brisk walking or 75 minutes of running each week. This recommendation serves as a baseline for promoting physical activity.

However, a further study by Pickover, (2016) suggests that the optimal range for obtaining the most health benefits from physical activity is between 3000 and 4000 MET-minutes per week. This indicates that engaging in higher levels of physical activity can have even greater positive effects on health.

It's important to note that these recommendations are general guidelines and can be adjusted based on individual capabilities and preferences. The draft action plan in the Czech Republic aims to promote physical activity among adults and older adults by providing these evidence-based recommendations to support improved health and well-being.

The public health recommendations outlined in the World Health Organization (WHO) Guidelines on physical activity and sedentary behavior are designed to be applicable to all populations and age groups, regardless of age, gender, cultural background, socioeconomic status, or physical abilities (World Health Organization, 2020). These recommendations are intended to promote physical activity and reduce sedentary behavior in a broad and inclusive manner, ensuring that everyone could improve their health and well-being through appropriate levels of physical activity. By providing recommendations that are inclusive and applicable to diverse populations, the WHO aims to encourage and facilitate physical activity participation for individuals from all walks of life, promoting healthier lifestyles and reducing the risk of noncommunicable diseases associated with sedentary behavior.

2.4.1 Physical activity recommendations for children and youths (5–17 years)

Physical activity in children and adolescents has a wide range of health benefits across various outcomes. Regular engagement in physical activity during childhood and adolescence has been associated with positive effects on their well-being throughout their lives in these categories (Figure 1):

1. Physical fitness: Regular physical activity promotes improvements in cardiorespiratory fitness (the ability of the heart and lungs to supply oxygen to the muscles) and muscular fitness (strength, endurance, and flexibility of muscles).
2. Cardiometabolic health: Physical activity plays a role in maintaining healthy blood pressure, lipid profile (cholesterol and triglyceride levels), glucose regulation, and insulin sensitivity, which are important for cardiovascular and metabolic health.
3. Bone health: Weight-bearing activities, such as running or jumping, can enhance bone density and strength, reducing the risk of osteoporosis and fractures later in life.

4. Cognitive outcomes: Physical activity has been linked to improved cognitive function, including better academic performance, attention, and concentration. It may also positively influence executive function skills, such as problem-solving, decision-making, and goal-setting.
5. Mental health: Regular physical activity has been associated with a reduced risk of depression and anxiety symptoms in children and adolescents. It can contribute to improved overall mental well-being, self-esteem, and stress management.
6. Adiposity: Adequate physical activity levels are important for maintaining a healthy body weight and reducing the risk of obesity in children and adolescents.

By engaging in regular physical activity during childhood and adolescence, individuals can experience these health benefits, which can have long-term positive effects on their well-being throughout their lives (WHO, 2020).

Figure 1

WHO recommendation on physical activity for children and adolescents (source WHO, 2020)

2.4.2 Physical activity recommendations for adults (18–64 years)

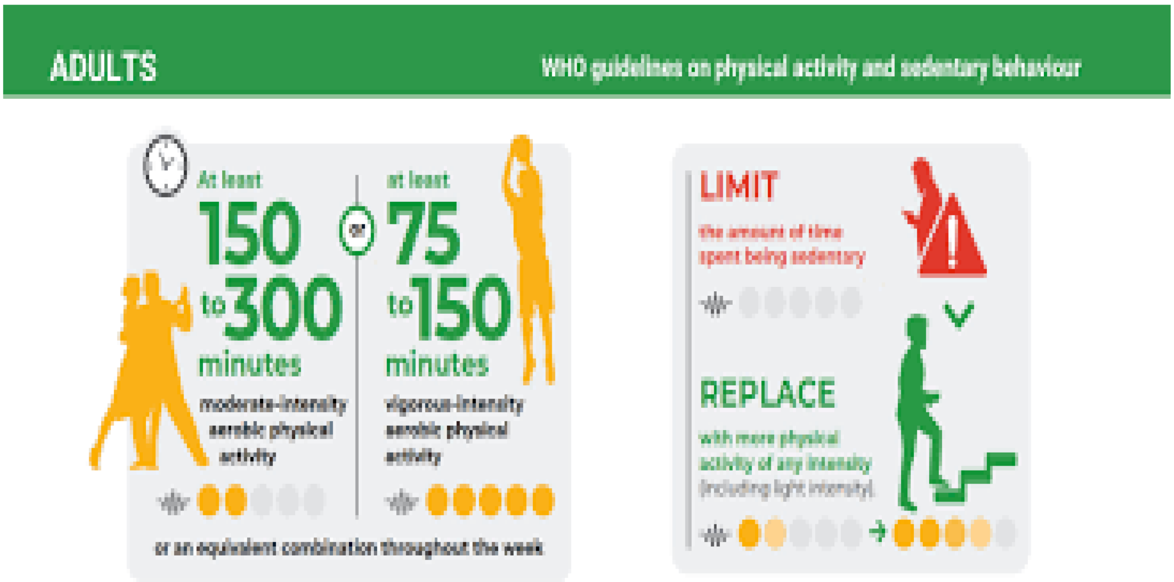
The physical activity recommendations for adults (Rütten, 2016) and as outlined in the WHO Guidelines on physical activity and sedentary behavior (2020), are based on robust evidence and aim to improve various aspects of health. The objective is to enhance overall health, including reducing the risk of mortality, cardiovascular disease, hypertension, certain cancers, and type-2 diabetes. It also contributes to better mental health, cognitive function, sleep, and helps manage body fat levels. The key recommendations are as follows:

1. Aerobic Physical Activity:
   Adults should engage in moderate-intensity aerobic activity for 150-300 minutes (2.5-5 hours) per week. Alternatively, they can opt for vigorous-intensity aerobic activity for 75-150 minutes per week. It is also acceptable to combine moderate- and vigorous-intensity activities to meet the weekly duration goal.
2. Muscle-Strengthening Exercises:
   Adults should incorporate muscle-strengthening activities into their routine on two or more days per week. These exercises should target major muscle groups in the body, such as the legs, hips, back, abdomen, chest, shoulders, and arms. Examples of muscle-strengthening activities include weightlifting, resistance training, and bodyweight exercises.
3. Additional Health Benefits:
   Adults can go beyond the minimum recommendations to achieve even greater health benefits. This can involve increasing the duration of moderate- or vigorous-intensity aerobic activity to more than 300 minutes per week, more than 150 minutes of each, or a combination of both.

By following these guidelines, adults can improve their overall health and well-being through regular physical activity, including both aerobic exercises and muscle-strengthening activities (Figure 2).

Figure 2

WHO recommendation on physical activity for adults (source WHO, 2020)



2.4.3 Physical activity recommendations for older adults (65 years and above)

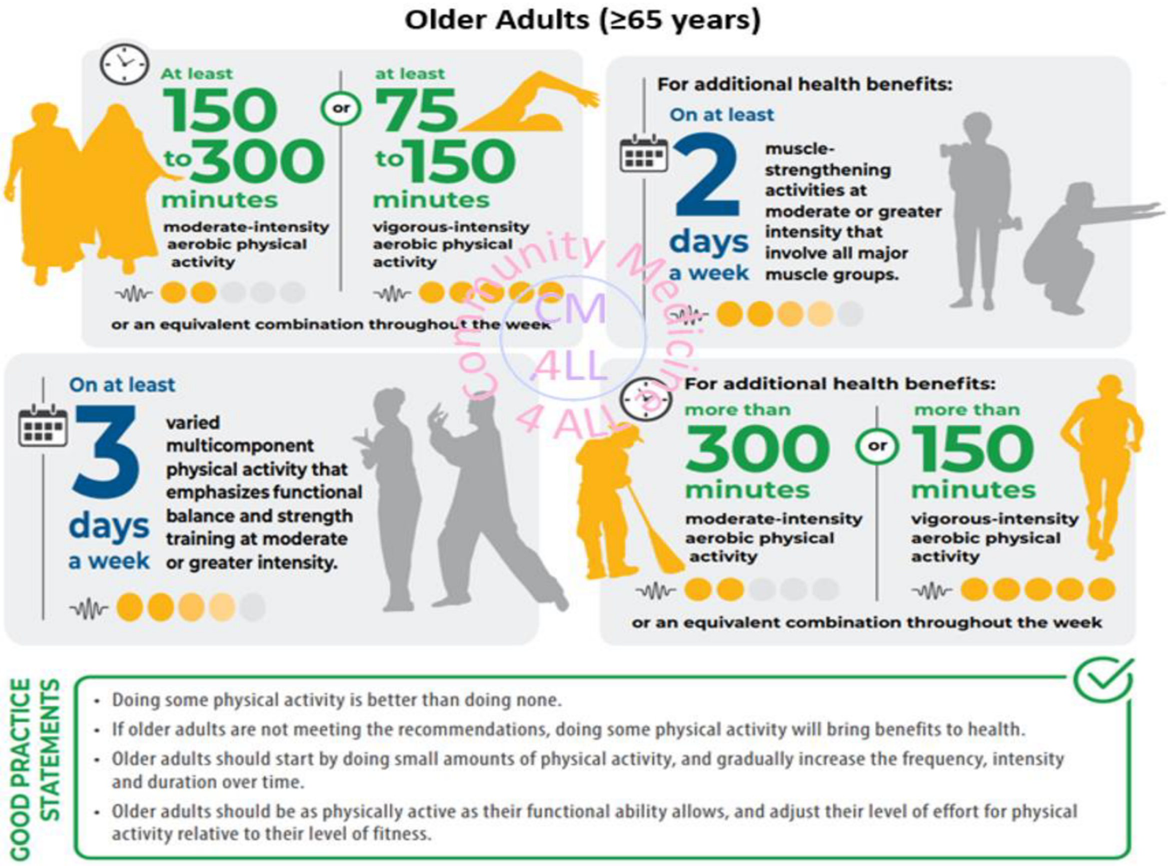
Older adults, aged 65 and above, can also experience health benefits through regular physical activity. These benefits include improvements in balance, physical function, and a reduction in the risk of falls and fall-related injuries. To enhance functional capacity and prevent falls, it is recommended that older adults engage in various types of exercises on three or more days per week, including aerobic activities, balance, and functional exercises, as well as strength and endurance exercises. These exercises should be performed at a moderate or greater intensity (Figure 3).

Reiterating the importance of physical activity for all adults, Bull et al. (2020) emphasize that any level of physical activity is better than being sedentary. The guidelines for older adults are supported by moderate-certainty evidence and suggest that significant health benefits can be obtained by engaging in moderate-intensity aerobic activities for 150-300 minutes per week, or vigorous-intensity activities for 75-150 minutes per week. Alternatively, an equivalent combination of moderate to vigorous physical activity can also be beneficial.

By following these recommendations, older adults can improve their functional capacity, reduce the risk of falls, and enhance their overall quality of life. It is important to note that the specific exercise programs and intensity should be tailored to the individual's abilities and health condition.

Figure 3

WHO recommendation on physical activity for older adults (source WHO, 2020)



2.4.4 Physical activity recommendations for adults based on number of steps

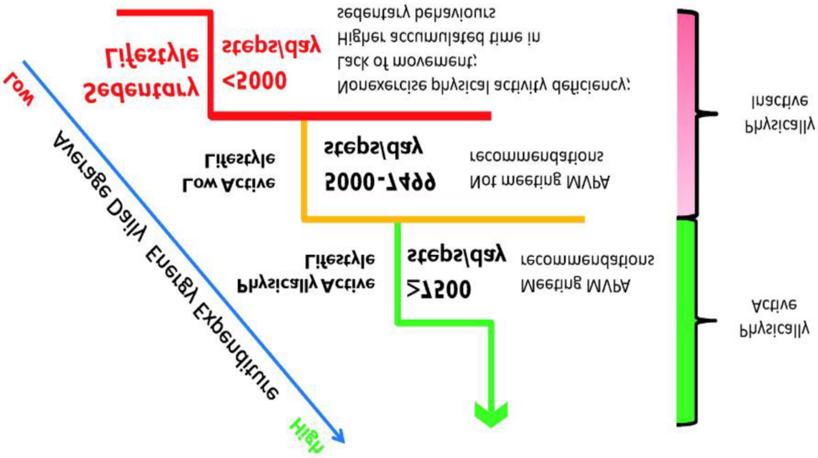
Step counting (using pedometers or accelerometers) is widely accepted by researchers, practitioners, and the general population alike for assessing, tracking, and communicating physical activity doses (Tudor-Locke et al., 2013). Enough walking (steps) is associated with health benefits and the target of getting 10,000 steps per day is widely recognized (Tudor-Locke et al., 2004). According to Sigmundová (2011) achieving 10,000 steps per day is health enhancing guidelines for the individual. Furthermore, Bohannon (2007) highlighted the popular recommendation of achieving 10,000 steps per day as a measure of physical activity. However, it should be noted that for certain individuals, reaching this specific step count may be challenging or unattainable.

According to Tudor-Locke et al. (2013) the require numbers of steps are described as (Figure 4):

- Sedentary lifestyle - (<5,000 steps/day)
- low active lifestyle - (5,000-7,499 steps/day)
- Somewhat active - (7,500-9,999 steps/day)
- Active - (≥10,000 steps/day)
- Highly active (>12,500 steps/day)

Figure 4

Step-defined sedentary lifestyle index for adults (source Tudor-Locke et al., 2013)



2.5 Structure of physical activity

The American College of Sports Medicine emphasizes that the structure of physical activity should be tailored to the specific type of activity and the individual's goals. It is crucial to select activities that are enjoyable and sustainable over time. Physical activity can also be structured in the form of aerobic and endurance, flexibility, strength, structured and unstructured (Parlak, 2020)).

Physical activity can manifest in various forms and be organized across different domains, including leisure, occupation or job, active transport, sedentary behavior, and home activities. These different domains of physical activity, when combined, can have potential effects on an individual's quality of life.

Leisure time physical activity refers to activities chosen by individuals during their free time. It encompasses all forms of physical activity that people engage in during their leisure hours (Steinbach, 2008). Distinguishing between leisure time activities and regular activities can be challenging due to their situational and subjective nature. Sports and exercise constitute a significant category within leisure time physical activity, as they involve intentional participation to improve physical fitness. In the Czech Republic, the level of mass sport activity is strongly influenced by the development of city structures, which include fitness centers, cycling paths, roller skating stadiums, beach volleyball fields, and golf courses (Sekot, 2013).

Physical activity in the form of active transport: Prince (2022) stated that active transport involves walking, cycling and other physical modes of travel to work, school, parks, cafes, shops, a friend's house, or other destinations. Using public transport such as bus or train also involves active travel when walking or cycling to and from stops, stations, home and destinations. Choosing to walk or cycle for transport offers many health benefits for the individual and community and can be integrated into daily routines such as commuting to and from school and work.

Physical activity at home: such as vacuuming, sweeping, gardening, and cleaning inside and outside where people live all count towards physical activity goal and provide health benefits (World Health Organization, 2020).

Job or occupational physical activity: It is beneficial to improve physical activity levels through the job or occupation when the job is associated with physical activity like farming, cleaning, doing construction work, elderly care within the timeframe of how long a person works, such as an 8-hour work shift (Shala, 2022).

Sedentary behavior: Tremblay (2017) explained that any waking behavior that involves sitting, lying down, or reclining while using less than 1.5 metabolic equivalents (METs) of energy is considered sedentary behavior. In general, this indicates that sedentary behavior occurs whenever a person is sitting or lying down. Typical sedentary activities include watching television, playing video games, using computers (together referred to as screen time), operating motor vehicles, and reading.

Any form of physical activity for every age group is structured considering the FITT Principle. This is confirmed by Billinger (2012) that ‘’the components of exercise prescription are frequency, intensity, time, and type (or modality). This represents quantity of physical activity needed to improve health similar to a pharmacologic intervention."

F – stands for frequency: which refer to refers to how often you engage in physical activity, for example 3 – 5 days a week

I – stands for Intensity, refers to the work rate, effort level, or metabolic demand of aerobic exercise and can be quantified in several ways, including HR, rate of oxygen consumption (VO2), rating of perceived exertion (RPE), watts, and/or walking speed/incline. It could be low-intensity physical activity, moderate-intensity physical activity, and high-intensity physical activity.

T – stands for Time, which refers to duration for performing physical activity. For example, 20 – 60 minutes of physical activity per day.

T – stands for Type, which refers to the type of physical activity such as aerobic physical activity for endurance or muscular strength physical activity (MacKay-Lyons, 2002).

2.5.1 International physical activity questionnaire

The International Physical Activity Questionnaire (IPAQ) was developed for international surveillance in early 1990 (Garcia, 2013). The International Physical Activity Questionnaire (IPAQ) was designed by the World Health Organization to measure health-related physical activity in populations (Hagströmer, 2006). In order to permit all countries to have a common questionnaire and compare the various domains of physical activity, IPAQ was designed. The items in the IPAQ entail moderate and vigorous intensity leisure time, domestic, occupation and transport domains. According to Baumann (2009) reliability and validity of the IPAQ have been conducted in 12 countries on 6 continents with standardized methods and proven to be all right. Baumann (2009) indicated that_the IPAQ was designed as a surveillance instrument to measure the various domains of physical activity. There are two versions of IPAQ - the short version and the long version. The long version of IPAQ measures the PA (MVPA) in the last 7 days among young and adults (15 – 69 years). The IPAQ short version measures the physical activity a person performs, frequency and duration of walking, moderate intensity and vigorous intensity performed for at least 10 minutes; to be active in the last 7 days.

Some of the strengths of IPAQ according to Baumann (2009); it can be applied to many different countries and cultures and measures multiple domains. The separate assessment of walking behavior, compared to many current PA surveillance systems Kruger, (2007) the short form of IPAQ is flexible to be used in telephone interviews.

However, some limitations are identified about using IPAQ. Self-reporting measures may overestimate physical activity, and this may occur in IPAQ survey. Again, respondents may find it difficult to differentiate between moderate and vigorous activities (Sallis, 2000).

2.6 Environment and quality of life

The environment encompasses both living and non-living elements, including natural and man-made (built) components, that can have a positive or negative impact on human life. It satisfies various human needs and can be categorized into social, cultural, and physical environments. However, this study specifically focuses on the physical environment, which includes both natural and built surroundings, and examines its influence on physical activity, particularly walking, and its impact on the quality of life of adults in the Czech Republic.

The physical environment consists of diverse components within the built environment, such as land-use patterns, architectural details, quality of landscaping, transportation systems, and facilities and services that facilitate movement between locations. These components play a crucial role in shaping individuals' access to opportunities for physical activity (Handy, 2002). Research has demonstrated that enhancing environmental safety can promote greater engagement in leisure time physical activity and active transportation (Mitas, 2018). Other studies have also indicated strong correlations between the visual appeal of the built environment, population density, street connectivity, accessibility of destinations, the walking and cycling environment, safety and aesthetics of playgrounds and play areas, quality and safety of pedestrian crossings and pavements, and community-level physical activity levels (Berrigan, 2010; Sofková, 2013).

Furthermore, numerous studies have highlighted that individuals residing in high-socioeconomic neighborhoods are more likely to participate in physical activity as part of their efforts to enhance quality of life. This association is linked to the quality of the built environment, which encompasses man-made structures such as homes, workplaces, schools, parks, recreation centers, playgrounds, greenways, transportation infrastructure, and automobiles (Renalds, 2010; McNeill, 2006).

2.6.1 Contextual uncertainty of environmental influences on walking

Chan et al. (2021) discussed the concept of contextual uncertainty regarding the influence of the environment on walking behavior. They emphasize that the circumstantial environment, including social, physical, and cultural factors, shapes an individual's behavior and experience. Traditionally, studies examining the association between walking and the environment assume consistent environmental influences on behavior across individuals. However, places and environments are socially constructed and experienced differently by different individuals, leading to highly personal and varied responses influenced by factors such as background, experience, perceptions, emotions, and interpretations of the environment (Wang, 2018; Kwan, 2018; Coulton et al., 2013).

Due to the individual-specific characteristics and interpretations, the contextual influences on an individual's walking behavior and experience become complex and unique to each person (Kwan, 2018). While existing studies in public health and transportation literature have primarily focused on the role of physical infrastructure in shaping walking experiences and behavior. Some studies have explored how social and cultural meanings attributed to walking influence an individual's daily walking behavior (Kwan, 2018). Therefore, we are also interested to further investigate the physical activity level especially walking behavior (steps) of adults in the Czech Republic and the environmental influence on physical activity. In the Czech Republic, for example, the city structure has been developed to include amenities such as cycling paths, roller skating facilities, fitness centers, stadiums, beach volleyball courts, and playgrounds (Sekot, 2013). This highlights the potential influence of the built environment in promoting physical activity and walking behaviors.

A study conducted by Saelens, (2003) talked about Neighborhood Environment Walkability Scale (NEWS), later developed into abbreviated version NEWS-A; an instrument that measure how residents perceive their environment in relation to transportation and urban planning. This explained that the local planning of the environment based on the practices of the people to affect behavior influenced NEWS items related to the level of walking among residents.

The NEWS and NEWS-A model measured and scored environmental factors such as the diversity of destinations, residential density, walking infrastructure, aesthetics, traffic safety, and crime, and explained that they were associated positively with walking for transport (Cerin, 2006). This gives clear indication that public health promotion in conjunction with the experts who plan the facilities in the neighborhood could ensure the environment is constructed in this manner; that would influence the physical activity behavior.

2.6.2 International physical activity and environment network

In 2000, Neighborhood Quality of Life Study (NQLS) was awarded (Drs. Sallis, Saelens, and Frank) to study the environmental correlates of physical activity in the U.S. using objective measures of environments (Geographic Information Systems) and physical activity (ActiGraph). In 2002, PLACE study in Australia was awarded (Dr. Owen) and in 2007-2008, used a similar study design was used in the Belgian Environmental Physical Activity Study (BEPAS) (Dr. De Bourdeadhuij). With these three studies serving as the foundation, the time was right to advocate for similar studies to be conducted in other countries, and there would be many advantages to using common study designs and measures. The International Physical Activity and the Environment Network (**IPEN**) was formed to invite and support investigators around the world to participate in this new area of research in August 2004 in Germany with the following aims:

- Stimulate research in physical activity and the environment.
- Support researchers through sharing of information, feedback, letters of support
- Recommend common methods and measures.

- Increase communication and collaboration between researchers investigating environmental correlates of physical activity.
- Bring together data from multiple countries for joint analyses.
- Aid in the publication of data through papers, special journal issues, symposia etc. (www.ipenproject.org).

In 2009, the National Institutes of Health funded the IPEN Study to further address underestimated associations of environmental correlates of physical activity due to the limited range of environments in any single country. The IPEN Study pooled data from 10 countries to estimate strengths of association between detailed measures of the built environment and physical activity in adults using the same study protocol across the countries (Neighborhood Environment Walkability Scale – NEWS; accelerometry and GIS). Similarly, the IPEN Adolescent study was launched in 2013 and funded by the National Institutes of Health. It was an observational, cross-sectional, multicounty study with the overarching goals to advance the science of environmental correlates of physical activity, sedentary behavior, and weight status, then use the results to inform policy changes nationally and internationally. The goal was to implement comparable methods and measures across diverse countries so data could be pooled across countries for analyses (www.ipenproject.org).

3 AIMS

3.1 Main aim

The main aim of this study is to describe physical activity levels in terms of steps per day and steps per week and its effects on quality of life of adults in the Czech Republic.

3.2 Partial aims

1) To describe the walking (steps) behavior of adults in the Czech Republic.
2) To describe intensity (MET-minutes per week) of adults in the Czech Republic and with the potential effect on their quality of life.
3) To find out the health status of adults in the Czech Republic based on physical activity levels.
4) To describe the differences in physical activity levels in adult living in high and low walkable neighborhoods.

3.3 Scientific questions

1. What is the physical activity level in terms of steps per day and steps per week and the potential impact on quality of life in adults of the Czech Republic?
2. What is the health status of adults in the Czech Republic in relation to physical activity (steps and MET-minutes/week) and quality of life?
3. Is there any difference in PA level based on objective and self-reported monitoring in the same people?
4. Is walkability of the environment related to level of physical activity in Czech adults?

4 METHODS

This is a cross sectional research with systematically randomly selected sample.

4.1 Participants and Settings

The descriptive approach was used with the adult participants from the Czech Republic aged 24 to 60 and above both men and women. Data were obtained by using physical activity questionnaire – IPAQ and ANEWS from the IPEN research study (Attachment 1). Pedometers were used to obtain data about physical activity. All data were processed in the online database INDARES.com that has been developed in at Faculty of Physical Culture, Palacký University in Olomouc (source). The System INDARES.COM is also used in research carried out in the Center for Kinanthropology Research.

Though the data was recorded from 2010 to 2013 and have been used in other studies with different purposes and methodology, the current study seeks to use information from this data in a different way to describe the steps made per day, weekdays, weekend, in adults of the Czech Republic. The sample for the study was screened based on years recorded 2010 – 2013, the final sample consisted of 1586 extracted participants.

Total of are 699 (44.1%) males and 887 (55.9%) females were selected from the research sample meeting the requirement of having both objective (pedometer) and self-reported (questionnaires) data. Basic descriptives of the sample are presented in table 1.

Table 1

Basic descriptive characteristics of the sample

	N (%))	Age (M±SD	Weight (M±SD)	Height (M±SD	BMI (M±SD)
Males	699 (44,1)	39,2±10,73	85,0±11,5	180,3±6,67	26,1±3,19
Females	887 (55,9)	41,9±9,97	67,8±11,6	166,9±5,87	24,3±4,12

4.2 Procedure

The study is based on data from IPEN adults Czech, with 1586 screened participants, aged from 24 to 60 and above from the Czech Republic (44,1 % males and 55,9 % females). Physical activity levels of the sample were analyzed with steps count and MET-minutes/week.

4.3 Measurements

The indicator of objectively measured physical activity included average number of steps per day during working days, weekend days and week obtained from pedometers with the record sheet (Attachment 2). The difference between physical activity (steps) levels of adults in the Czech Republic was described and compared. Additionally, walkability of participants' neighborhood was assessed using the total score for walkabilty from the NEWS-A (Attachment 1). Frequency and duration of light or moderate activity and vigorous activity was further assessed using the data from IPAQ questionnaire as part of the NEWS-A. All scoring of the questionnaires were in agreement with scoring protocols for each instrument.

4.4 Statistical analysis

Statistica software version 14 for data analysis was used for basic descriptive analysis. Due to non-normal distribution of the sample, we used Kruskal-Wallis nonparametric test. The level of statistical significance was set as $p \leq 0{,}05$. To analyze difference between meeting PA guidelines measured objectively and self-reported the t-test we used.

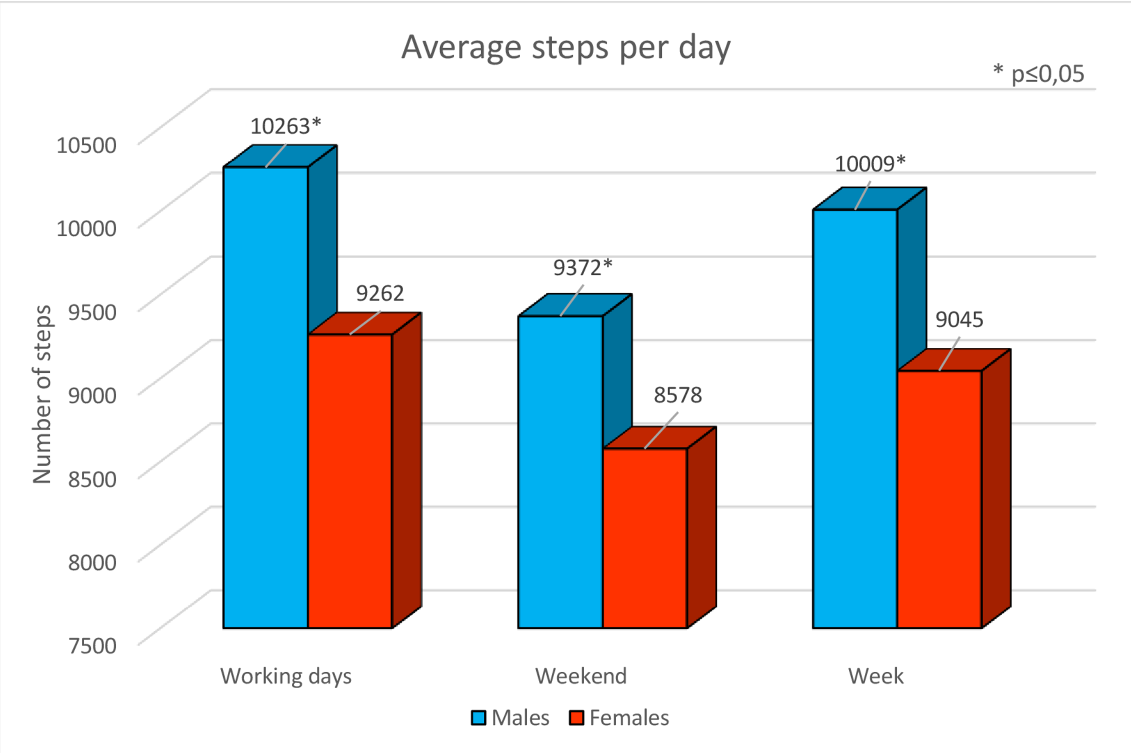
5 RESULTS

5.1 The level of physical activity in Czech males and females

When comparing the level of PA between males (n=699 and females (n=887) based on the results of PA monitoring using pedometers we can recognize that males are significantly more active than females in total average steps per week (10009 vs. 9045 steps per day) in favor of males [H (1, N= 1586) =25,214, p = ,000]. The same association was found for working days [H (1, N= 1586) =24,219, p = ,000] and weekends [H (1, N= 1586) =12,639, p = ,000]. The levels of differences are presented in Figure 5.

Figure 5

Number of steps in Czech males and females

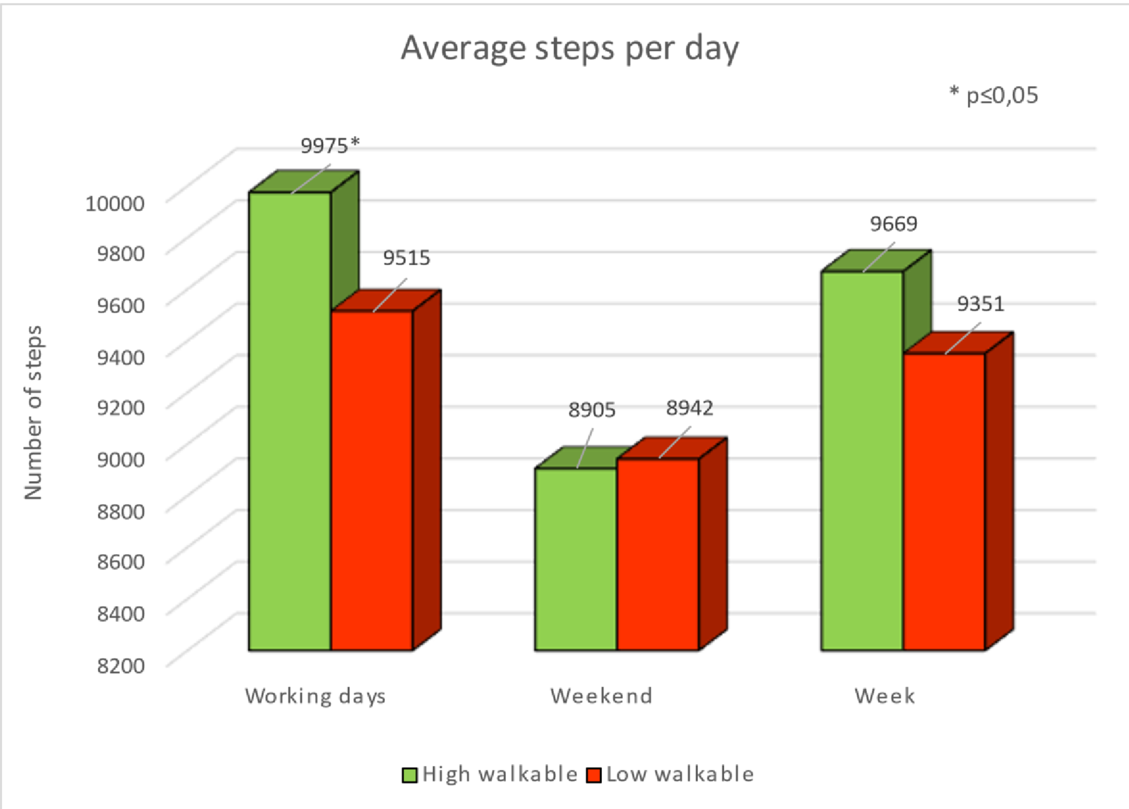


5.2 Physical activity level in varying walkability environment of Czech adults

Figure 6 illustrates the differences in PA levels (average number of steps) of Czech adults living in high and low walkable environments. It was found that those living in high walkable neighborhoods are significantly more active during working days [H (1, N= 1586) =4,015, p = ,045] compared to those living in low walkable areas. Average number of steps per day during the whole week is also higher in those living in high walkable neighborhoods, but the difference is not statistically significant [H (1, N= 1586) =1,774, p =,183]. No significant association was recognized also during the weekend days [H (1, N=1586) =,110, p=,740], however those living in low walkable neighborhoods indicated slightly more steps (8905 vs 8942).

Figure 6

Number of steps in Czech adults based on walkability of their neighborhood



5.2.1 Physical activity level in varying walkability environment of Czech males

Figure 7 illustrates the differences in PA levels (average number of steps) of Czech males living in high and low walkable environments. It was found that those living in high walkable neighborhoods are more active during working days [H (1, N= 699) =,656, p =,418] and during the whole week [H (1, N= 699) =,150, p =,698] than those living in low walkable areas, but the differences were not statistically significant. No significant association was recognized also during the weekend days [H (1, N= 699) =,581, p =,446], however those living in low walkable neighborhoods indicated slightly more steps (9316 vs 9410).

Figure 7

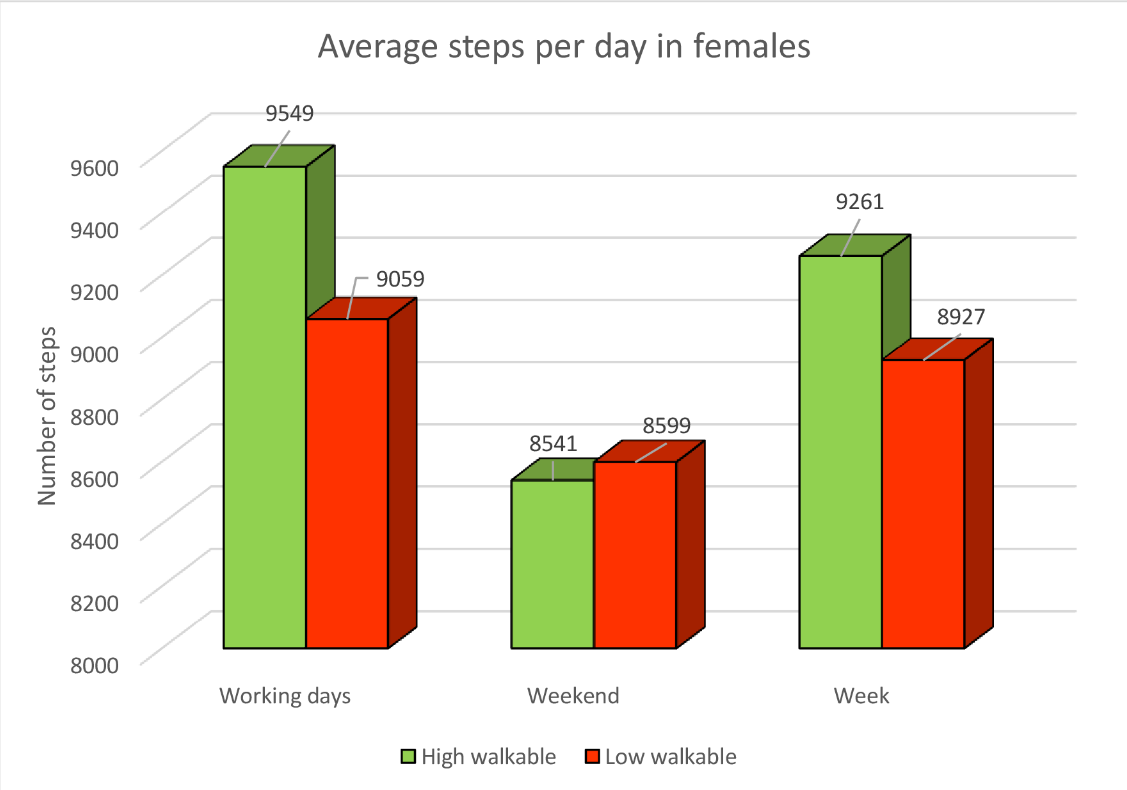
Number of steps in Czech males based on walkability of their neighborhood

5.2.2 Physical activity level in varying walkability environment of Czech females

Figure 8 illustrates the differences in PA levels (average number of steps) of Czech females living in high and low walkable environments. Similarly like in males, it was found that those living in high walkable neighborhoods are more active during working days [H (1, N= 887) =3,216, p =,073] and during the whole week (H (1, N= 887) =1,545, p =,214] than those living in low walkable areas, but with no statistically significant difference. No significant association was recognized also during the weekend days [H (1, N= 887) =,005, p =,945], however those living in low walkable neighborhoods indicated slightly more steps (8541 vs 8599).

Figure 8

Number of steps in Czech females based on walkability of their neighborhood



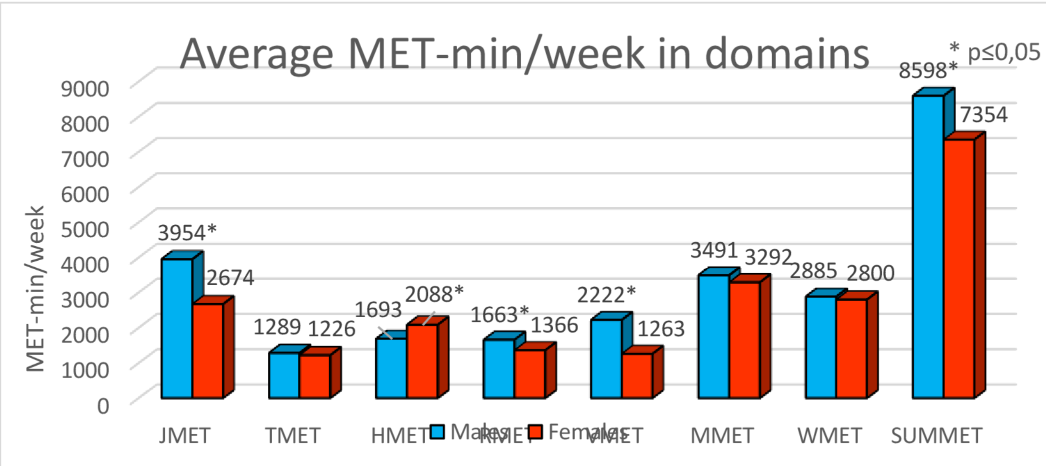
5.3 Level of physical activity of Czech adults in specific domains

Figure 9 shows the differences in PA levels (MET-min/week) of Czech males and females in specific domains: job-, transportation-, home-, recreation related, vigorous activity, moderate activity, walking and sum of week MET-minutes. We have found significant difference between males and females in job related domain [H (1, N= 1586) =48,341, p =,000]; in recreation related domain [H (1, N= 1586) =12,098, p =,001]; in vigorous activity level [H (1, N= 1586) =82,417, p =0,000] and in total sum of MET-minutes per week [H (1, N= 1586) =16,745, p =,000] in favor to males. The domain related to home and household activities is in favor for females, who were significantly more active than males [H (1, N= 1586) =27,540, p =,000].

In all other remaining domains males indicated higher levels of PA, but the differences were not statistically significant: transportation related domain [H (1, N= 1586) ==,203, p =,652]; moderate activities [H (1, N= 1586) =2,110, p =,146] and walking related activities [H (1, N= 1586) =,171, p =,679]. The men walk more during their usual daily activities.

Figure 9

Average MET-min/week in specific domains in Czech males and females



Notes. JMET – job related MET-min/week; TMET – transportation related MET-min/week; HMET – home related MET-min/week; RMET - recreation related v; VMET - vigorous MET-min/week; MMET - moderate MET-min/week; WMET – walking MET-min/week; SUMMET – sum of MET-min/week; MET-min/week – sum of week MET-minutes.

5.4 Meeting the physical activity guidelines in Czech adults

The results in table 2 indicate that 41,1 % of Czech adults are meeting the guidelines of 10,000 step per day when measuring their behavior objectively. At the same time the same people self-reported in the questionnaires, that is 76,9 % of them are meeting the guidelines of 3000 MET-minutes/week of activities and above per week.

The difference between meeting guidelines measured objectively and self-reported is statistically significant (t=21,963, p=,000) which indicates that self-reported measure is with higher risk to indicate overestimates in conclusion of such results.

Table 2

Meeting the guidelines from objective and self-reported measures in Czech adults

Meeting the guideline	Yes		No	
	N	%	N	%
Steps	652	41,1	934	58,9
MET-min/week	1219	76,9	367	23,1

Note. Steps – meeting the guidelines 10000 steps per day; MET-min/week – meeting the guidelines ≥ 3000 MET-min per week.

We can find similar results, if we compare the same variable in males (Table 3). The results indicate that 47,2 % of Czech males are meeting the 10,000 step per day recommendation when measured objectively and 78,8 % of them when self -reported to meet at least 3000 MET-minutes/week of activities per week.

Table 3

Meeting the guidelines from objective and self-reported measures in Czech adult males

Meeting the guideline	Yes		No	
	N	%	N	%
Steps	330	47,2	369	52,8

MET-min/week	551	78,8	148	21,2

Note. Steps – meeting the guidelines 10000 steps per day; MET-min/week – meeting the guidelines ≥ 3000 MET-min per week.

When comparing the same variable in females (Table 4) we recognized lower levels of those meeting guidelines than males, but still with high discrepancies between objective (36,3 %) and self -reported (75,3 %) meeting at of the guidelines.

Table 4

Meeting the guidelines from objective and self-reported measures in Czech adult females

Meeting the guideline	Yes		No	
	N	%	N	%
Steps	322	36,3	565	63,7
MET-min/week	668	75,3	219	24,7

Note. Steps – meeting the guidelines 10000 steps per day; MET-min/week – meeting the guidelines ≥ 3000 MET-min per week.

6 DISCUSSION

The primary objective of this thesis was to examine the physical activity levels of adults in the Czech Republic, specifically in terms of daily and weekly step counts, and investigate the impact on their quality of life.

The study findings revealed that only 41.1% of Czech adults demonstrate a high level of physical activity and meet the recommended guideline of achieving 10,000 steps per day when their behavior is objectively measured. This indicates that more than half of the adults in the Czech Republic fall into the category of being insufficiently active, and, as Tully (2007) suggests, may not have a healthy lifestyle that contributes to maintaining a desirable body weight, blood pressure, mood improvement, and overall positive impact on quality of life. This aligns with the findings of Pelclova et al. (2016), who also reported that almost two-thirds of Czech adults do not meet the recommended activity levels.

When comparing the physical activity levels between females and males, it was observed that males in the Czech Republic can be characterized as highly active based on their high average number of steps per day, week, and weekdays (Tudor-Lock, 2012). Males tend to increase their step count during working days and throughout the week, indicating a health-enhancing behavior. However, their average steps slightly drop below the recommended 10,000 steps guideline during the weekends. Similarly, females tend to have higher step counts on working days and per week, indicating a physically active lifestyle (Tudor-Lock, 2012). Nonetheless, their step count is slightly lower compared to males.

Furthermore, the study found that Czech adults residing in walkable neighborhoods exhibit higher levels of physical activity compared to those living in low walkable environments. This supports the notion that the environment has a significant influence on people's walking behavior, as highlighted by previous research by Hillsdon (1996) and Chan et al. (2021).

6.1 Physical activity level in terms of steps per day and steps per week and the potential impact on quality of life in adults of the Czech Republic

6.1.1 The level of physical activity in Czech males and females

The analysis of the results showed that slightly more than half of the males (52.78%) can be classified as somewhat active according to Tudor-Locke et al. (2012), indicating that they have insufficient health-enhancing steps. On the other hand, 47.21% of the males are considered active with an adequate number of steps to improve their health and quality of life, as suggested by Welk et al. (2000). The male participants achieved high or adequate step counts on working days in both high and low walkable neighborhoods. During the week, they achieved high step counts specifically in high walkable neighborhoods.

Among females, 36.30% were categorized as active, indicating that they have high levels of physical activity with adequate steps to improve their health, according to Tudor-Locke (20122). On the other hand, 63.69% of females were classified as somewhat active based on Tudor-Locke's (20122) criteria. Most females increased their physical activity levels in high walkable environments during working days and throughout the week. Although their step counts did not reach the recommended 10,000 steps per day (9549 vs. 9045) and (9261 vs. 8927) steps, as suggested by Tudor-Locke (20122), their activity levels were still better than being inactive, as emphasized by Bull (2020).

Interestingly, females living in low walkable environments displayed lower levels of physical activity during working days and the week. However, it is noteworthy that females in low walkability environments increased their physical activity levels (steps) during the weekend. This finding suggests that individuals' responses to their environments can be highly personal and vary significantly based on their background, experiences, perceptions, emotions, and interpretations of the environment, as discussed by Kwan (2018).

6.1.2 Physical activity level in varying walkability environment of Czech adults

The partial aim of this thesis was to examine the average number of steps per day among adults in the Czech Republic, taking into account the walkability of their neighborhood environments. The results revealed that 41.12% of the participants achieved an adequate number of steps to improve their health, while 58.89% had insufficient steps. It was observed that individuals in high walkable areas tended to have more steps during working days compared to weekends. This suggests that in high walkable areas, people's daily activities, such as walking from home to bus stops or shops (Sigmundová, 2011), traversing connective routes, and engaging in work-related tasks (Morris, 1997), incorporate walking into their routines.

Interestingly, during the weekend, there was a slight increase in the number of steps in low walkable environments compared to high walkable neighborhoods. This suggests that the walkability may not always influence high levels of physical activity (steps) (Chan et al., 2021) and raises the debate regarding the embodiment of a walkable environment (Andrews, 2012). There was not much difference in the number of steps between working days and weekends in low walkable environments (9515 vs. 9351). This implies that the walkability of the environment can influence walking behavior in any domain (Chan et al., 2021), although individual responses to their environment may vary on a personal level (Wang, 2018).

6.1.3 Level of physical activity of Czech adults in specific domains

One of the aims was to illustrate the levels of self-reported physical activity (in MET-minutes/week) across different domains. The findings of the study indicate that 76.9% of Czech adults indicate high level of physical activity and can be classified as highly active based on IPAQ scoring protocol. This aligns with the classification of physical activity levels among Czech adults by Hamrik et al. (2014), who categorized individuals into high, moderate, and low activity levels based on MET-minutes/week. It is worth noting that males tend to have higher activity scores than females, particularly in the domain of vigorous physical activity. Both males and females demonstrated high MET-minutes/week with a slight difference in moderate physical activity levels (3491 vs.

3292). On average, males accumulate 8598 MET-minutes per week, while females accumulate 7354 MET-minutes per week. A similar study by Mitas et al. (2021) also reported that women have an average of more than 5000 MET-min/week, while men have more than 6000 MET-min/week.

The results indicate that males increase their MET-minutes/week in moderate physical activity, although to a lesser extent compared to the MET-minutes/week accumulated over the entire week. This trend is similar for females in the same domains, suggesting that both males and females engage more in moderate-intensity physical activity and less in vigorous physical activity. In seven out of the eight domains, males in the Czech Republic demonstrate higher levels of activity (Sekot, 2013), except in the home-related domain where females are more active than males. This consistent pattern of intensity is also observed within specific domains, indicating that Czech adults derive health benefits from physical activity (Murtagh et al., 2002).

6.2 The health status of adults in the Czech Republic in relation to physical activity (steps and MET-minutes/week) and quality of life

Based on the data and results of the study, it can be inferred that individuals who engage in high levels of physical activity and meet the guidelines for physical activity are more likely to experience positive health outcomes and improvements. Meeting the recommended levels of physical activity has been associated with various health benefits, such as maintaining a healthy body weight, reducing the risk of chronic diseases (e.g., cardiovascular disease, diabetes), improving mood and mental well-being, and enhancing overall quality of life (Sigmundová, 2011). Therefore, individuals who have high physical activity levels are more likely to experience these health benefits and have improved health outcomes compared to those who are less physically active.

6.2.1 Meeting the physical activity guidelines in Czech adults

Based on the data presented in results we know that 41.12% of the total sample, representing 652 individuals, are meeting the recommended guidelines of 10,000 steps per day. This group can be classified as having a high level of physical activity and is likely to experience improved health and quality of life (Bull et al., 2020; WHO, 2022). It suggests that these individuals are actively engaging in sufficient physical activity to potentially enhance their overall well-being. On the other hand, 58.89% of the adults in the Czech Republic, represented by 934 individuals, are not enough active and fail to achieve the guidelines of 10,000 steps per day. This group can be described as having a moderate level of physical activity or being insufficiently active (Tudor-Locke, 2001). It is important to note that individuals who do not meet the guidelines may have a higher risk of experiencing poorer health and lower quality of life compared to those who are physically active.

Additionally, when considering the MET-minutes/week, 76.86% of the adults in the Czech Republic, accounting for 1219 individuals, are meeting the guidelines of 3000 MET-minutes/week or more. This indicates a high level of physical activity and suggests that approximately two-thirds of the adults in the Czech Republic are engaging in sufficient activity (Sigmundová, 2011) to potentially impact their health positively (Lee, 2008). However, it is worth mentioning that a study by Pelclová et al. (2016) found contradictory results, suggesting that almost two-thirds of Czech adults are inactive, which implies poorer health and quality of life. These conflicting findings highlight the complexity and potential variations in physical activity levels among different populations and studies.

Overall, based on the presented data, meeting the recommended guidelines for physical activity, whether in terms of steps per day or MET-minutes/week, appears to be associated with better health outcomes and potentially higher quality of life.

6.3 The difference in PA level based on objective and self-reported monitoring

This study highlighted significant differences between the results obtained from objective monitoring (using a pedometer) and self-reported monitoring of physical activity (questionnaire). When using objective monitoring, 41.1% of the adults in the sample achieved the guidelines for physical activity in terms of steps, while 58.9% did not meet the guidelines. However, when relying on self-reported monitoring, 76.9% of the adults reported achieving the guidelines for physical activity in terms of MET-minutes/week, while only 23.1% did not meet the guidelines.

These discrepancies suggest that self-reported monitoring may be influenced by social desirability and overestimation biases (Ainsworth, et al., 2012). Individuals may tend to report engaging in more physical activity than they do to present themselves in a favorable light. Self-reporting relies on individuals' recall and judgment, which can be subjective and prone to memory lapses and biases (Tom, et al., 1998).

On the other hand, objective monitoring using a pedometer is considered more accurate and reliable in capturing individuals' actual physical activity behavior. Pedometers provide objective data on step counts, which can be used to assess adherence to physical activity guidelines. Objective monitoring eliminates the potential biases associated with self-reported monitoring and provides more reliable information on individuals' physical activity levels (John et al., 2008).

Overall, the study emphasized the importance of objective monitoring, such as using pedometers, in obtaining accurate and reliable data on individuals' physical activity behavior, while highlighting the limitations and potential biases associated with self-reported monitoring.

7 CONCLUSIONS

The conclusion of the present study highlights several key points regarding the level of physical activity and its impact on the quality of life among adults in the Czech Republic:

1. Approximately 41.1% of Czech adults meet the recommended guidelines of 10,000 steps per day, while 58.89% do not meet this goal.
2. Around 76.9% of Czech adults meet the guidelines of more than 3000 MET-minutes/week, indicating a high level of physical activity, while 23.1% do not meet this guideline.
3. Males exhibit significantly higher levels of physical activity compared to females, as observed in both objective (47.2 % vs. 36.3 %) and self-reported monitoring methods (78.8% vs. 75.3%).
4. It is suggested that adults who meet the guidelines for both steps and MET-minutes/week have improved health and quality of life.
5. Both males and females who are living in high walkable neighborhoods are more active than those living in low walkable areas.

Overall, the study findings emphasize the importance of addressing low physical activity levels among adults in the Czech Republic. Strategies that focus on enhancing the built environment, particularly promoting walkability, may play a crucial role in encouraging higher levels of physical activity and ultimately improving the quality of life for individuals in these communities.

8 SOUHRN

Touha po zdravém a kvalitním životním stylu, tedy možnost zvládat všechny aspekty života, včetně fyzického zdraví, sociálních, ekonomických, environmentálních, výživových a emocionálních problémů a schopnosti přizpůsobit se změnám, se stala národním i celosvětovým problémem u všech skupin populace. Česká republika by měla udělat maximum pro to, aby dospělí byli aktivní, měli přístup ke kvalitní zdravotní péči a očekávali podmínky prostředí, které podporují pohybovou aktivitu. Prospěšnost pohybové aktivity v prevenci neinfekčních onemocnění, snižování krevního tlaku, udržování zdravé hmotnosti a mnoha dalších byla několikrát prokázána. Tato práce se zaměřila na popis úrovně pohybové aktivity dospělých Čechů v počtu průměrných kroků za den, za víkend a za celý týden a na zjištění, zda splňují doporučení 10000 kroků za den a >3000 MET-minut/týden pro zlepšení zdraví a kvality života.

Výzkumu se zúčastnili dospělí obyvatelé České republiky ve věku od 20 do 60 let a výše. Výsledky studie doplňují dostupné poznatky v oblasti pohybové aktivity a veřejného zdraví české dospělé populace. Celkem 1586 dospělých osob (887 = 55,9 % žen), které byly pečlivě vybrány ze dvou hlavních zdrojových souborů (sledovány údaje o věku, výšce, BMI a lokalitě místa bydliště). Údaje byly získány ze studie IPEN Adult prostřednictvím objektivního a subjektivního monitoringu. Základní popisné statistiky a další analýzy byly realizovány pomocí softwaru Statistica verze 14.

Výsledky ukázaly, že 41,1 % dospělých v České republice splňuje doporučenou hodnotu 10 000 kroků denně. Rozdíl mezi úrovní průměrných kroků mužů a žen za den, týden a víkend naznačil, že muži jsou více pohybově aktivní ve většině domén ve srovnání se ženami. Přibližně 76,9 % dospělých v České republice splňuje doporučenou hodnotu >3000 MET-minut/týden. Stejně jako u kroků, rozdíly mezi muži a ženami ukazují, že muži mají vyšší úroveň pohybové aktivity (MET-minut/týden) ženy.

Muži i ženy, kteří žijí ve lokalitách s vyšší pěší dostupností, jsou aktivnější než ti, kteří žijí v oblastech s nižší pěší dostupností.

K základním limitám práce patří to, že nemáme dostatek informací k hodnocení úrovně sedavého chování české populace. Také časové stáří dat se mohlo projevit odlišností výsledků od současného stavu.

Výsledky práce zdůrazňují význam řešení nízké úrovně pohybové aktivity českých dospělých. Je nezbytné realizovat strategie, které podporují zlepšení zastavěného prostředí s důrazem na pěší dostupnost. Tyto snahy by mohly povzbudit muže i ženy k vyšší úrovni pohybové aktivity, což by následně mohlo vést ke znatelnému zlepšení jejich kvality života.

9 SUMMARY

The desire to have healthy life and enjoy quality of life for adults by being able to manage all aspects of living including physical health, social, economic, environmental, nutritional, emotional and ability to adapt to changes, have become national and global concern. The Czech Republic as a country should do the best to ensure that adults are active, get access to high quality healthcare and address environmental factors that promote physical activity levels. Many studies have provided evidence of the benefits of physical activity including prevention of noncommunicable disease, lowers blood pressure, maintaining healthy weight, and many more. The focus of this thesis was describing the physical activity levels of Czech adults in the contest of average steps per day, steps per weekend and steps per week, and find out whether they meet guidelines of 10000 steps per day and >3000 MET-minutes/week to improve their health and quality of life. Participants were adults age from 20 to 60 and above in the Czech Republic. The findings from the study would be added to the available knowledge in the field of physical activity and public health. The sample size was 1586 adults (887 = 55.9% females), were carefully extracted using age, height, BMI, and location from two major files. The data were obtained from IPEN Adult Czech study through the objective and self-reported measurement. The basic descriptive analysis of the data was done using Statistica version 14 software.

The results indicated that 41.1% of adults in Czech Republic meet the guidelines 10,000 steps per day. The difference between the level of males and females' average steps per day, per week and per weekend indicated that males demonstrated higher level of physical activity (steps) in most of the domains the study compared with females. Approximately 76.9% of adults in Czech Republic are meeting guideline of >3000 MET-minutes/week. Like the differences we recognized between males and females in step; the males have higher level of physical activity (MET-minutes/week) in most of the domains than females.

Both males and females who are living in high walkable neighborhoods are more active than those living in low walkable areas.

However, the study was limited by not having enough information to have describe the level of sedentary behavior of the Czech adults. Also, time delay in results might be various from current situation.

The findings of the thesis highlight the significance of addressing low levels of physical activity among Czech adults. It is essential to implement strategies that prioritize the improvement of the built environment, with a specific emphasis on walkability. These efforts might have a great impact by encouraging individuals to engage in higher levels of physical activity, which in turn can lead to notable improvements in their overall quality of life.

10 REFERENCE LIST

Akranavičiūtė, D., & Ruževičius, J. (2007). Quality of life and its components' measurement. *Engineering economics, 52*(2).

Acree, L. S., Longfors, J., Fjeldstad, A. S., Fjeldstad, C., Schank, B., Nickel, K. J., ... & Gardner, A. W. (2006). Physical activity is related to quality of life in older adults. *Health and quality of life outcomes*, *4*(1), 1-6.

Alves, L. A. (2020). What is it and how to achieve quality of life? *Goiano Bulletin of Geography*, *40*(01), 1–22. https://doi.org/10.5216/bgg.v40i01.57699

Andrews, G. J., Hall, E., Evans, B., & Colls, R. (2012). Moving beyond walkability: On the potential of health geography. *Social science & medicine*, *75*(11), 1925-1932.

Ainsworth B., et al (2012). Recommendations to improve the accuracy of estimates of physical activity derived from self report. 9 (1). page 76–84

Bandosz, P., O'Flaherty, M., Drygas, W., Rutkowski, M., Koziarek, J., Wyrzykowski, B., ... & Capewell, S. (2012). Decline in mortality from coronary heart disease in Poland after socioeconomic transformation: modelling study. *Bmj*, *344*.

Bassett, D. R., Pucher, J., Buehler, R., Thompson, D. L., & Crouter, S. E. (2008). Walking, cycling, and obesity rates in Europe, North America, and Australia*. Journal of physical activity and health, 5*(6), 795-814.

Bauman, A., Bull, F., Chey, T., Craig, C. L., Ainsworth, B. E., Sallis, J. F., ... & Pratt, M. (2009). The international prevalence study on physical activity: results from 20 countries. *International journal of behavioral nutrition and physical activity*, *6*(1), 1-11.

Berrigan, D., Pickle, L. W., & Dill, J. (2010). Associations between street connectivity and active transportation. *International journal of health geographics, 9*, 1-18.

Billinger, S. A., Taylor, J. M., & Quaney, B. M. (2012). Cardiopulmonary response to exercise testing in people with chronic stroke: a retrospective study. *Stroke research and treatment,* 2012.

Bohannon, R. W. (2007). Number of pedometer-assessed steps taken per day by adults: A descriptive meta-analysis*. Physical therapy, 87*(12). doi: 10.2522/ptj.20060037

Bull, F. C., Al-Ansari, S. S., Biddle, S., Borodulin, K., Buman, M. P., Cardon, G., ... & Willumsen, J. F. (2020). World Health Organization 2020 guidelines on physical activity and sedentary behaviour. *British journal of sports medicine, 54*(24), 1451-1462.

Cerin, E., Saelens, B. E., Sallis, J. F., & Frank, L. D. (2006). Neighborhood Environment Walkability Scale: validity and development of a short form. *Medicine and science in sports and exercise*, *38*(9), 1682.

Chan, E. T., Li, T. E., Schwanen, T., & Banister, D. (2021). People and their walking environments: An exploratory study of meanings, place and times. *International Journal of Sustainable Transportation, 15*(9), 718-729.

Christiansen, L. B., Cerin, E., Badland, H., Kerr, J., Davey, R., Troelsen, J., ... & Sallis, J. F. (2016). International comparisons of the associations between objective measures of the built environment and transport-related walking and cycling: IPEN adult study. *Journal of transport & health*, *3*(4), 467-478.

Christiansen, L. B., Madsen, T., Schipperijn, J., Ersbøll, A. K., & Troelsen, J. (2014). Variations in active transport behavior among different neighborhoods and across adult life stages. *Journal of transport & health*, *1*(4), 316-325.

Coulton, C. J., Jennings, M. Z., & Chan, T. (2013). How big is my neighborhood? Individual and contextual effects on perceptions of neighborhood scale. *American journal of community psychology*, *51*(1-2), 140-150.

Eurostat. (2017). *Final report of the expert group on quality of life indicators*.

Furmonavičius, T. (2001). Quality of life research in medicine. *Biomedical*, *1*(2), 128-132.

Garcia, C. M. (2013). *Validity and reliability of the international physical activity questionnaire among Mexican adults* (Doctoral dissertation, Queen's University (Canada)).

Ghimire, P. R., Agho, K. E., Renzaho, A., Christou, A., Nisha, M. K., Dibley, M., & Raynes-Greenow, C. (2017). Socio-economic predictors of stillbirths in Nepal (2001-2011). *PloS one*, *12*(7), e0181332.

Hamrik, Z., Sigmundová, D., Kalman, M., Pavelka, J., & Sigmund, E. (2014). Physical activity and sedentary behaviour in Czech adults: results from the GPAQ study. *European journal of sport science*, *14*(2), 193-198.

Hagströmer, M., Oja, P., & Sjöström, M. (2006). The International Physical Activity Questionnaire (IPAQ): a study of concurrent and construct validity. *Public health nutrition*, *9*(6), 755-762.

Handy, S. L., Boarnet, M. G., Ewing, R., & Killingsworth, R. E. (2002). How the built environment affects physical activity: views from urban planning. *American journal of preventive medicine, 23*(2), 64-73.

Hillsdon, M., & Thorogood, M. (1996). A systematic review of physical activity promotion strategies. *British journal of sports medicine, 30*(2), 84-89.

Haines, D. J., Davis, L., Rancour, P., Robinson, M., Neel-Wilson, T., & Wagner, S. (2007). A pilot intervention to promote walking and wellness and to improve the health of college faculty and staff. *Journal of American College Health, 55*(4), 219-225.

John R., et al, (2008). Objective Measurement of Physical Activity and Sedentary Behaviour: Review with New Data. 93(7). 614-9. DOI:10.1136/adc.2007.13327

Kang, M., Marshall, S. J., Barreira, T. V., & Lee, J. O. (2009). Effect of pedometer-based physical activity interventions: a meta-analysis. *Research quarterly for exercise and sport*, *80*(3), 648-655.

Kwan, M. P. (2018). The limits of the neighborhood effect: Contextual uncertainties in geographic, environmental health, and social science research. *Annals of the American Association of Geographers*, *108*(6), 1482-1490.

Kruger, J., Kohl III, H. W., & Miles, I. J. (2007). Prevalence of regular physical activity among adults-United States, 2001 and 2005. *Morbidity and Mortality Weekly Report*, *56*(46), 1209-1212.

Lamberts, M., & Pauwels, F. (2006). *European Foundation for the Improvement of Living and Working Conditions The tripartite EU agency providing knowledge to assist in the development of better social, employment and work-related policies*

Lee, I. M., & Buchner, D. M. (2008). The importance of walking to public health. *Medicine & Science in Sports & Exercise, 40*(7), S512-S518.

Lima, M. G., Barros, M. B. D. A., César, C. L. G., Goldbaum, M., Carandina, L., & Ciconelli,

MacKay-Lyons, M. J., & Makrides, L. (2002). Exercise capacity early after stroke. *Archives of physical medicine and rehabilitation, 83*(12), 1697-1702.

McNeill, L. H., Kreuter, M. W., & Subramanian, S. V. (2006). Social environment and physical activity: a review of concepts and evidence. *Social science & medicine, 63*(4), 1011-1022.

Mitáš, J., & Frömel, K. (2021). Case study from Eastern Europe: Physical activity in the Czech Republic—a society in transformation. In *Physical Activity in Low-and Middle-Income Countries* (pp. 232-246). Routledge.

Mitáš, J., Frömel, K., Horák, S., Nykodým, J., Racek, O., Řepka, E., ... & Klobouk, T. (2013). Self-reported physical activity in perceived neighborhood in Czech adults-national study. *Acta Gymnica*, *43*(2), 23-30.

Mitáš, J., Sas-Nowosielski, K., Groffik, D., & Frömel, K. (2018). The safety of the neighborhood environment and physical activity in Czech and Polish adolescents. International journal of environmental research and public health, 15(1), 126.

Morris, J. N., & Hardman, A. E. (1997). Walking to health. *Sports medicine, 23*, 306-332.

Murtagh, E. M., Boreham, C. A., & Murphy, M. H. (2002). Speed and exercise intensity of recreational walkers. *Preventive medicine*, *35*(4), 397-400

Pate, R. R. (1995). Physical activity and health: dose-response issues. *Research quarterly for exercise and sport*, *66*(4), 313-317.

Pelclová, J., Frömel, K., Řepka, E., Bláha, L., Suchomel, A., Fojtík, I., ... & Vorlíček, M. (2016). Is pedometer-determined physical activity decreasing in Czech adults? Findings from 2008 to 2013. *International Journal of Environmental Research and Public Health*, *13*(10), 1040.

Parlak, E. (2020). Exercise in special conditions. *Innovations in Health Sciences*, 94.

Pickover, E. (2016). This is the amount of exercise you should be doing every day**.** *Independent.* Retrieved August 10 from: https://www.independent.co.uk/life-style/health-and-families/health-news/exercise-health-disease-amount-you-should-be-doing-every-day-a7181261.html#comments-area

Prince, S. A., Lancione, S., Lang, J. J., Amankwah, N., de Groh, M., Garcia, A. J., ... & Geneau, R. (2022). Are people who use active modes of transportation more physically active? An overview of reviews across the life course. Transport reviews, 42(5), 645-671.

Qi, Q., Li, Y., Chomistek, A. K., Kang, J. H., Curhan, G. C., Pasquale, L. R., ... & Qi, L. (2012). Television watching, leisure time physical activity, and the genetic predisposition in relation to body mass index in women and men. Circulation, 126(15), 1821-1827.

Renalds, A., Smith, T. H., & Hale, P. J. (2010). A systematic review of built environment and health. Family and community health, 68-78.

Rütten, A., Pfeifer, K., Banzer, W., Ferrari, N., Füzéki, E., Geidl, W., ... & Ungerer-Röhrich, U. (2016). *National recommendations for physical activity and physical activity promotion*. FAU University Press.

Ruževičius, J. (2014, May). Quality of Life and of Working Life: Conceptions and research. In 17th Toulon-Verona International Conference, Liverpool John Moores University, England (pp. 28-29).

Sallis, J. F., & Saelens, B. E. (2000). Assessment of physical activity by self-report: status, limitations, and future directions. *Research quarterly for exercise and sport*, *71*(sup2), 1-14.

Saelens, B. E., Sallis, J. F., Black, J. B., & Chen, D. (2003). Neighborhood-based differences in physical activity: an environment scale evaluation. *American journal of public health*, *93*(9), 1552-1558.

Sekot, A. (2013). Physical activities as a part of leisure in Czech society.

Shala, R. (2022). 'I'm active enough in my job.'Why is occupational physical activity not enough? *British Journal of Sports Medicine, 56*(16), 897-898.

Sigmundová, D., ChmelÍk, F., Sigmund, E., Feltlová, D., & Frömel, K. (2013). Physical activity in the lifestyle of Czech university students: Meeting health recommendations. *European Journal of Sport Science*, *13*(6), 744-750.

Sigmundová, D., El Ansari, W., & Sigmund, E. (2011). Neighbourhood environment correlates of physical activity: a study of eight Czech regional towns. *International journal of environmental research and public health*, *8*(2), 341-357.

Sloane, P. D., Zimmerman, S., Walsh, J. F., & Eckert, J. K. (2001). The physical environment. *Assisted living*, 173-197.

Sofková, T., Pridalová, M., Mitás, J., & Pelclová, J. (2013). The level of neighborhood walkability in a place of residence and its effect on body composition in obese and overweight women. *Central European journal of public health, 21*(4), 184.

Sowa-Kofta, A., Szetela, A., & Golinowska, S. (2017). Health promotion for the oldest seniors in the social sector: examples of policies and programmes from Poland and the Czech Republic. *Epidemiology Biostatistics and Public Health*, *14*(2, suppl. 1).

Steinbach, D., & Graf, C. (2008). Leisure time physical activity and sedentariness. *Encyclopedia of public health*, 849-851.

Stewart, A. L., Mills, K. M., King, A. C., Haskell, W. L., Gillis, D. A. W. N., & Ritter, P. L. (2001). CHAMPS physical activity questionnaire for older adults: outcomes for interventions. *Medicine & Science in Sports & Exercise, 33*(7), 1126-1141

Subramanian, S. K., Sharma, V. K., Arunachalam, V., Radhakrishnan, K., & Ramamurthy, S. (2015). Effect of structured and unstructured physical activity training on cognitive functions in adolescents–a randomized control trial. *Journal of clinical and diagnostic research: JCDR, 9*(11), CC04.

Tom A E., et al (1998). Measuring subjective outcomes. 13(11). 757–761. https://doi.org/10.1046/j.1525-1497.1998.00228.x

Tremblay, M. S., Aubert, S., Barnes, J. D., Saunders, T. J., Carson, V., Latimer-Cheung, A. E., ... & Chinapaw, M. J. (2017). Sedentary behavior research network (SBRN)–terminology consensus project process and outcome. *International journal of behavioral nutrition and physical activity, 14*, 1-17.

Tudor-Locke, C., & Bassett, D. R. (2004). How many steps/day are enough? Preliminary pedometer indices for public health. *Sports medicine*, *34*, 1-8.

Tudor-Locke, C. E., & Myers, A. M. (2001). Challenges and opportunities for measuring physical activity in sedentary adults. *Sports medicine, 31*, 91-100.

Tudor-Locke, C., Craig, C. L., Thyfault, J. P., & Spence, J. C. (2012). A step-defined sedentary lifestyle index:< 5000 steps/day. *Applied physiology, nutrition, and metabolism*, *38*(2), 100-114. https://doi.org/10.1139/apnm-2012-0235

Tully, M. A., Cupples, M. E., Hart, N. D., McEneny, J., McGlade, K. J., Chan, W. S., & Young, I. S. (2007). Randomised controlled trial of home-based walking programmes at and below current recommended levels of exercise in sedentary adults. *Journal of Epidemiology & Community Health, 61*(9), 778-783.

Wang, J., Lee, K., & Kwan, M. P. (2018). Environmental influences on leisure-time physical inactivity in the US: An exploration of spatial non-stationarity. *ISPRS*

International Journal of Geo-Information, 7(4), 143. https://doi.org/10.3390/ijgi7040143

World Health Organization. (2020). *WHO guidelines on physical activity and sedentary behaviour: web annex: evidence profiles*.

World Health Organization. Regional Office for Europe. (2018). Physical activity factsheets for the 28 European Union Member States of the WHO European Region. World Health Organization. Regional Office for Europe. https://apps.who.int/iris/handle/10665/345141

World Health Organization. (2022). Promoting physical activity through schools: policy brief.

World Health Organization. (2021). *Physical activity fact sheet (No. WHO/HEP/HPR/RUN/2021.2)*. World Health Organization.

World Health Organization. (2008). Pacific physical activity guidelines for adults: Framework for accelerating the communication of physical activity guidelines.

Welk, G. J., Differding, J. A., Thompson, R. W., Blair, S. N., Dziura, J., & Hart, P. (2000). The utility of the Digi-walker step counter to assess daily physical activity patterns. *Medicine & Science in Sports & Exercise, 32*(9), S481-S488.

11 ATTACHMENTS

11.1 Neighborhood environment walkability scale – abbreviated (ANEWS) questionnaire

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We would like to find out more information about your physical activity, the way that you perceive or think about your quality of life and the neighborhood you live in. Please answer the following questions about your neighborhood and yourself.

A. Quality of Life

Please check one answer.

1. In general, would you say your health is:
   - ❑ 1. Excellent
   - ❑ 2. Very good
   - ❑ 3. Good
   - ❑ 4. Fair
   - ❑ 5. Poor

B. *Satisfaction with Life Scale*

Below are five statements with which you may agree or disagree. Using the 1-7 scale below, indicate your agreement with each item by placing the appropriate number on the line preceding that item.

Please be open and honest in your responding. The 7-point scale is as follows:

1 = strongly disagree
2 = disagree
3 = slightly disagree
4 = neither agree nor disagree
5 = slightly agree
6 = agree
7 = strongly agree

____ 1. In most ways my life is close to my ideal.

____ 2. The conditions of my life are excellent.

____ 3. I am satisfied with my life.

____ 4. So far I have gotten the important things I want in life.

____ 5. If I could live my life over, I would change almost nothing.

C. Types of residences in your neighborhood

Please circle the answer that best applies to you and your neighborhood.

1. How common are detached single-family residences in your immediate neighborhood?

1	2	3	4	5
None	A few	Some	Most	All

2. How common are townhouses or row houses of 1-3 stories in your immediate neighborhood?

1	2	3	4	5
None	A few	Some	Most	All

3. How common are apartments or condos 1-3 stories in your immediate neighborhood?

1	2	3	4	5
None	A few	Some	Most	All

4. How common are apartments or condos 4-6 stories in your immediate neighborhood?

1	2	3	4	5
None	A few	Some	Most	All

5. How common are apartments or condos more than 6 stories in your immediate neighborhood?

1	2	3	4	5
None	A few	Some	Most	All

D. Stores, facilities, and other things in your neighborhood

About how long would it take to get from your home to the nearest businesses or facilities listed below if you walked to them? Please put only one check mark (√) for each business or facility.

	1-5 min	6-10 min	11-20 min	20-30 min	30+ min	don't know
example: gas station	**1.** ____	**2.** ____	**3.** √	**4.** ____	**5.** ____	**8.** ____
1. convenience/small grocery store	1. ____	2. ____	3. ____	4. ____	5. ____	8. ____
2. supermarket	1. ____	2. ____	3. ____	4. ____	5. ____	8. ____
3. hardware store	1. ____	2. ____	3. ____	4. ____	5. ____	8. ____
4. fruit/vegetable market	1. ____	2. ____	3. ____	4. ____	5. ____	8. ____
5. laundry/dry cleaners	1. ____	2. ____	3. ____	4. ____	5. ____	8. ____
6. clothing store	1. ____	2. ____	3. ____	4. ____	5. ____	8. ____
7. post office	1. ____	2. ____	3. ____	4. ____	5. ____	8. ____
8. library	1. ____	2. ____	3. ____	4. ____	5. ____	8. ____
9. elementary school	1. ____	2. ____	3. ____	4. ____	5. ____	8. ____
10. other schools	1. ____	2. ____	3. ____	4. ____	5. ____	8. ____
11. book store	1. ____	2. ____	3. ____	4. ____	5. ____	8. ____
12. fast food restaurant	1. ____	2. ____	3. ____	4. ____	5. ____	8. ____
13. coffee place	1. ____	2. ____	3. ____	4. ____	5. ____	8. ____
14. bank/credit union	1. ____	2. ____	3. ____	4. ____	5. ____	8. ____
15. non-fast food restaurant	1. ____	2. ____	3. ____	4. ____	5. ____	8. ____
16. video store	1. ____	2. ____	3. ____	4. ____	5. ____	8. ____
17. pharmacy/drug store	1. ____	2. ____	3. ____	4. ____	5. ____	8. ____
18. salon/barber shop	1. ____	2. ____	3. ____	4. ____	5. ____	8. ____
19. your job or school [check here _____ if not applicable]	1. ____	2. ____	3. ____	4. ____	5. ____	8. ____
20. bus or train stop	1. ____	2. ____	3. ____	4. ____	5. ____	8. ____
21. park	1. ____	2. ____	3. ____	4. ____	5. ____	8. ____
22. recreation center	1. ____	2. ____	3. ____	4. ____	5. ____	8. ____
23. gym or fitness facility	1. ____	2. ____	3. ____	4. ____	5. ____	8. ____

E. Access to services

Please circle the answer that best applies to you and your neighborhood. Both local and within walking distance mean within a 10-15 minute walk from your home.

1. Stores are within easy walking distance of my home.

1	2	3	4
strongly disagree	somewhat disagree	somewhat agree	strongly agree

2. Parking is difficult in local shopping areas.

1	2	3	4
strongly disagree	somewhat disagree	somewhat agree	strongly agree

3. There are many places to go within easy walking distance of my home.

1	2	3	4
strongly disagree	somewhat disagree	somewhat agree	strongly agree

4. It is easy to walk to a transit stop (bus, train) from my home.

1	2	3	4
strongly disagree	somewhat disagree	somewhat agree	strongly agree

5. The streets in my neighborhood are hilly, making my neighborhood difficult to walk in.

1	2	3	4
strongly disagree	somewhat disagree	somewhat agree	strongly agree

6. There are major barriers to walking in my local area that make it hard to get from place to place (for example, freeways, railway lines, rivers).

1	2	3	4
strongly disagree	somewhat disagree	somewhat agree	strongly agree

7. There are many canyons/hillsides in my neighborhood that limit the number of routes for getting from place to place.

1	2	3	4
strongly disagree	somewhat disagree	somewhat agree	strongly agree

F. Streets in my neighborhood

Please circle the answer that best applies to you and your neighborhood.

1. The streets in my neighborhood do not have many cul-de-sacs (dead-end streets).

1	2	3	4
strongly disagree	somewhat disagree	somewhat agree	strongly agree

2. The distance between intersections in my neighborhood is usually short (100 yards or less; the length of a football field or less).

1	2	3	4

strongly disagree	somewhat disagree	somewhat agree	strongly agree

3. There are many alternative routes for getting from place to place in my neighborhood. (I don't have to go the same way every time.)

1	2	3	4
strongly disagree	somewhat disagree	somewhat agree	strongly agree

G. Places for walking and cycling

Please circle the answer that best applies to you and your neighborhood.

1. There are sidewalks on most of the streets in my neighborhood.

1	2	3	4
strongly disagree	somewhat disagree	somewhat agree	strongly agree

2. Sidewalks are separated from the road/traffic in my neighborhood by parked cars.

1	2	3	4
strongly disagree	somewhat disagree	somewhat agree	strongly agree

3. There are bicycle or pedestrian trails in or near my neighborhood that are easy to get to.

1	2	3	4
strongly disagree	somewhat disagree	somewhat agree	strongly agree

4. There is a grass/dirt strip that separates the streets from the sidewalks in my neighborhood.

1	2	3	4
strongly disagree	somewhat disagree	somewhat agree	strongly agree

5. It is safe to ride a bike in or near my neighborhood.

1	2	3	4
strongly disagree	somewhat disagree	somewhat agree	strongly agree

H. Neighborhood surroundings

Please circle the answer that best applies to you and your neighborhood.

1. There are trees along the streets in my neighborhood.

1	2	3	4
strongly	somewhat	somewhat	strongly

disagree	disagree	agree	agree

2. There are many interesting things to look at while walking in my neighborhood.

1	2	3	4
strongly disagree	somewhat disagree	somewhat agree	strongly agree

3. There are many attractive natural sights in my neighborhood (such as landscaping, views).

1	2	3	4
strongly disagree	somewhat disagree	somewhat agree	strongly agree

4. There are attractive buildings/homes in my neighborhood.

1	2	3	4
strongly disagree	somewhat disagree	somewhat agree	strongly agree

G. Neighborhood safety

Please circle the answer that best applies to you and your neighborhood.

1. There is so much traffic along <u>nearby</u> streets that it makes it difficult or unpleasant to walk in my neighborhood.

1	2	3	4
strongly disagree	somewhat disagree	somewhat agree	strongly agree

2. The speed of traffic on most <u>nearby</u> streets is usually slow (30 mph or less).

1	2	3	4
strongly disagree	somewhat disagree	somewhat agree	strongly agree

3. Most drivers exceed the posted speed limits while driving in my neighborhood.

1	2	3	4
strongly disagree	somewhat disagree	somewhat agree	strongly agree

4. My neighborhood streets are well lit at night.

1	2	3	4
strongly disagree	somewhat disagree	somewhat agree	strongly agree

5. Walkers and bikers on the streets in my neighborhood can be easily seen by people in their homes.

1	2	3	4
strongly disagree	somewhat disagree	somewhat agree	strongly agree

6. There are crosswalks and pedestrian signals to help walkers cross busy streets in my neighborhood.

1	2	3	4
strongly disagree	somewhat disagree	somewhat agree	strongly agree

7. There is a high crime rate in my neighborhood.

1	2	3	4
strongly disagree	somewhat disagree	somewhat agree	strongly agree

8. The crime rate in my neighborhood makes it unsafe to go on walks <u>during the day</u>.

1	2	3	4
strongly disagree	somewhat disagree	somewhat agree	strongly agree

9. The crime rate in my neighborhood makes it unsafe to go on walks <u>at night</u>.

1	2	3	4
strongly disagree	somewhat disagree	somewhat agree	strongly agree

Great. You have finished the first part!

INTERNATIONAL PHYSICAL ACTIVITY QUESTIONNAIRE

We are interested in finding out about the kinds of physical activities that people do as part of their everyday lives. The questions will ask you about the time you spent being physically active in the **last 7 days**. Please answer each question even if you do not consider yourself to be an active person. Please think about the activities you do at work, as part of your house and yard work, to get from place to place, and in your spare time for recreation, exercise or sport.

Think about all the **vigorous** and **moderate** activities that you did in the **last 7 days**. **Vigorous** physical activities refer to activities that take hard physical effort and make you breathe much harder than normal. **Moderate** activities refer to activities that take moderate physical effort and make you breathe somewhat harder than normal.

PART 1: JOB-RELATED PHYSICAL ACTIVITY

The first section is about your work. This includes paid jobs, farming, volunteer work, course work, and any other unpaid work that you did outside your home. Do not include unpaid work you might do around your home, like housework, yard work, general maintenance, and caring for your family. These are asked in Part 3.

1. Do you currently have a job or do any unpaid work outside your home?

☐ Yes

☐ No → *Skip to PART 2: TRANSPORTATION*

The next questions are about all the physical activity you did in the **last 7 days** as part of your paid or unpaid work. This does not include traveling to and from work.

2. During the **last 7 days**, on how many days did you do **vigorous** physical activities like heavy lifting, digging, heavy construction, or climbing up stairs **as part of your work**? Think about only those physical activities that you did for at least 10 minutes at a time.

_____ **days per week**

☐ No vigorous job-related physical activity → *Skip to question 4*

3. How much time did you usually spend on one of those days doing **vigorous** physical activities as part of your work?

_____ **hours per day**
_____ **minutes per day**

4. Again, think about only those physical activities that you did for at least 10 minutes at a time. During the **last 7 days**, on how many days did you do **moderate** physical activities like carrying light loads **as part of your work**? Please do not include walking.

_____ **days per week**

☐ No moderate job-related physical activity → *Skip to question 6*

5. How much time did you usually spend on one of those days doing **moderate** physical activities as part of your work?

_____ **hours per day**
_____ **minutes per day**

6. During the **last 7 days**, on how many days did you **walk** for at least 10 minutes at a time **as part of your work**? Please do not count any walking you did to travel to or from work.

_____ **days per week**

☐ No job-related walking → *Skip to PART 2: TRANSPORTATION*

7. How much time did you usually spend on one of those days **walking** as part of your work?

_____ **hours per day**
_____ **minutes per day**

PART 2: TRANSPORTATION PHYSICAL ACTIVITY

These questions are about how you traveled from place to place, including to places like work, stores, movies, and so on.

8. During the **last 7 days**, on how many days did you **travel in a motor vehicle** like a train, bus, car, or tram?

_____ **days per week**

☐ No traveling in a motor vehicle → *Skip to question 10*

9. How much time did you usually spend on one of those days **traveling** in a train, bus, car, tram, or other kind of motor vehicle?

_____ **hours per day**
_____ **minutes per day**

Now think only about the **bicycling** and **walking** you might have done to travel to and from work, to do errands, or to go from place to place.

10. During the **last 7 days**, on how many days did you **bicycle** for at least 10 minutes at a time to go **from place to place**?

_____ **days per week**

☐ No bicycling from place to place → *Skip to question 12*

11. How much time did you usually spend on one of those days to **bicycle** from place to place?

_____ **hours per day**
_____ **minutes per day**

12. During the **last 7 days**, on how many days did you **walk** for at least 10 minutes at a time to go **from place to place**?

_____ **days per week**

☐ No walking from place to place → *Skip to PART 3: HOUSEWORK, HOUSE MAINTENANCE, AND CARING FOR FAMILY*

13. How much time did you usually spend on one of those days walking from place to place?

____ **hours per day**
____ **minutes per day**

PART 3: HOUSEWORK, HOUSE MAINTENANCE, AND CARING FOR FAMILY

This section is about some of the physical activities you might have done in the **last 7 days** in and around your home, like housework, gardening, yard work, general maintenance work, and caring for your family.

14. Think about only those physical activities that you did for at least 10 minutes at a time. During the **last 7 days**, on how many days did you do **vigorous** physical activities like heavy lifting, chopping wood, shoveling snow, or digging **in the garden or yard**?

____ **days per week**

☐ No vigorous activity in garden or yard → ***Skip to question 16***

15. How much time did you usually spend on one of those days doing **vigorous** physical activities in the garden or yard?

____ **hours per day**
____ **minutes per day**

16. Again, think about only those physical activities that you did for at least 10 minutes at a time. During the **last 7 days**, on how many days did you do **moderate** activities like carrying light loads, sweeping, washing windows, and raking **in the garden or yard**?

____ **days per week**

☐ No moderate activity in garden or yard → ***Skip to question 18***

17. How much time did you usually spend on one of those days doing **moderate** physical activities in the garden or yard?

____ **hours per day**
____ **minutes per day**

18. Once again, think about only those physical activities that you did for at least 10 minutes at a time. During the **last 7 days**, on how many days did you do **moderate** activities like carrying light loads, washing windows, scrubbing floors and sweeping **inside your home**?

____ **days per week**

☐ No moderate activity inside home → ***Skip to PART 4: RECREATION, SPORT AND LEISURE-TIME PHYSICAL ACTIVITY***

19. How much time did you usually spend on one of those days doing **moderate** physical activities inside your home?

_____ **hours per day**
_____ **minutes per day**

PART 4: RECREATION, SPORT, AND LEISURE-TIME PHYSICAL ACTIVITY

This section is about all the physical activities that you did in the **last 7 days** solely for recreation, sport, exercise or leisure. Please do not include any activities you have already mentioned.

20. Not counting any walking you have already mentioned, during the **last 7 days**, on how many days did you **walk** for at least 10 minutes at a time **in your leisure time**?

_____ **days per week**

☐ No walking in leisure time → ***Skip to question 22***

21. How much time did you usually spend on one of those days **walking** in your leisure time?

_____ **hours per day**
_____ **minutes per day**

22. Think about only those physical activities that you did for at least 10 minutes at a time. During the **last 7 days**, on how many days did you do **vigorous** physical activities like aerobics, running, fast bicycling, or fast swimming **in your leisure time**?

_____ **days per week**

☐ No vigorous activity in leisure time → ***Skip to question 24***

23. How much time did you usually spend on one of those days doing **vigorous** physical activities in your leisure time?

_____ **hours per day**
_____ **minutes per day**

1. Again, think about only those physical activities that you did for at least 10 minutes at a time. During the **last 7 days**, on how many days did you do **moderate** physical activities like bicycling at a regular pace, swimming at a regular pace, and doubles tennis **in your leisure time**?

_____ **days per week**

☐ No moderate activity in leisure time → ***Skip to PART 5: TIME SPENT SITTING***

2. How much time did you usually spend on one of those days doing **moderate** physical activities in your leisure time?

_____ **hours per day**
_____ **minutes per day**

PART 5: TIME SPENT SITTING

The last questions are about the time you spend sitting while at work, at home, while doing course work and during leisure time. This may include time spent sitting at a desk, visiting friends, reading or sitting or lying down to watch television. Do not include any time spent sitting in a motor vehicle that you have already told me about.

3. During the **last 7 days**, how much time did you usually spend **sitting** on a **weekday**?

____ **hours per day**
____ **minutes per day**

4. During the **last 7 days**, how much time did you usually spend **sitting** on a **weekend day**?

____ **hours per day**
____ **minutes per day**

DEMOGRAPHIC QUESTIONS

1. Sex: ___ Male
___ Female

2. How old were you on your last birthday?
___ Years
___ Don't know/Not sure
___ Refuse to Answer

3. How many years of education have you completed?
___ Years
___ Don't know/Not sure
___ Refuse to Answer

4. Do you currently work for pay?
___ Yes
___ No → *Go to Item 6*
___ Don't know/Not sure → *Go to Item 6*
___ Refuse to Answer → *Go to Item 6*

5. If yes, how many hours per week do you work in all your jobs?
___ Hours/week
___ Don't know/Not sure
___ Refuse to Answer

6. Which location best describes where you live?
____ A large city (100 000 inhabitants or more)
____ A medium-sized town (30 000 –100 000 inhabitants)
____ A small town (1,000 – 29,999 inhabitants)
____ A small community or village (less than 1,000 inhabitants)
____ I do not know/ I am not sure
____ I refuse to answer

General information

Please print clearly.

1. First name, Last name:

____

2. Home address:

____
Street Apt/Suite

City ____________________________________

______________________ ____________________
State Zip Code

3. Phone number:

4. Email: _______________________

5. What is your nationality: ______________

6. Height: _____ centimeters

7. Weight: ________ kilograms

8. What was your <u>highest</u> education level completed? (please check one).
   1. Less than 7th grade _____
   2. Junior high/middle school _____
   3. Some high school _____
   4. Completed high school _____
   5. Some college or vocational training _____
   6. Completed college or university _____
   7. Completed graduate degree _____

9. How many people (including yourself) live in your household? _______ people

10. How many children under 18 live in your household? ________

11. What are the ages of the children living in your household (if any)?

a) _________ b) __________ c) __________ d) _________ e) _________ f) _________

12. a) What type of residence do you live in? (please circle one).

    1. Single family house
    2. Multi-family house
    3. Apartment
    4. Condominium/townhouse
    5. Other _______________

    b) Which type of a residential area do you live in? Choose one option:
    ____ Old „core" area (old buildings in the historic center of a town)
    ____ Traditional neighborhood (neighborhoods around the historic neighborhood center)

____ Neighborhood with prefabricated houses (apartment blocks typical for urban development in the communist era)
____ Satellite neighborhoods on the outskirts of a town (new apartment houses and family houses with gardens)

c) Which floor do you live on? ____________
Is there a lift on your apartment house? 1. Yes _____ 0. No _____
Do you use the lift in your house? 1. Yes _____ 0. No _____

13. Do you rent or own your home? 1. Own/buying _____ 2. Rent _____

14. How long have you lived at your current address? _____ year(s); ______ month(s)

15. Do you have a valid driver's license? 1. Yes _____ 0. No _____ How many kilometers do you drive a year approximately? _____

16. How many drivable motor vehicles (cars, trucks, motorcycles) are there at your household? _______

17 What is your marital status? (please circle one).

1. Married
2. Widowed/divorced/separated
3. Single and never married
4. Living with partner

18 Approximate monthly household income in Czech crowns(please check one)

1. <10,000 _____
2 . 10,000-14,000 _____
3. 15,000-19,000 _____
4. 20,000-24,000 _____
5. 25,000-29,000 _____
6. 30,000-34,000 _____
7. 35,000-39,000 _____
8. 40,000-59,000 _____
9. 60,000-79,000 _____
10. 80,000-99,000 _____
11. > 100,000 _____

19. Are you a smoker? 1. Yes _____ 0. No _____

20. Do you own a bike? 1. Yes _____ 0. No _____ How many kilometers do you ride a year approximately? _____

21. Do you have a dog? 1. Yes _____ 0. No _____

22. How many times a week do you participate in any organized physical activity? _____ times/week

23. What physical activity do you participate in most regularly ____________________ and what physical activity would you like to participate in ______________________________?
I do not participate in any physical activity ☐

Thank you for your time and effort.

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11.2 Record sheet for pedometer

Center for Kinanthropology Research
Faculty of Physical Culture

Palacky University
in Olomouc

Record of weekly physical activity (Pedometer)

First name: ______________ Surname: ______________ Height [kg]: ______________

First day of monitoring: ______________ Last day of monitoring: ______________ Weight [cm]: ______ Age: ______

What data will be used form pedometer?

Grey fields in the table are required to be filled in.

White fields are voluntary, but we encurage you to fill in them too. The feedback after the monitoring will be more detailed and more valuable for you.

Fill in the data from pedometer (time, number of steps and kcal) into the table every day. Do not reset the pedometer. If you coincidentally reset the device, continue in recording while starting with "0".

Organized physical activity (in contrast to unorganized) is a physical activity under the leadership of the coach.

Meter instructions: Wear the meter snugly around your waist, either underneath or on top of your clothing. It should be worn just above your right hipbone. Put it on in the morning, just after getting out of bed or just after you shower/bathe. Take it off just before you go to bed at night. Take the meter off during the course of the day only when showering, bathing, or swimming.

Day of measurement	1. day	2. day	3. day	4. day	5. day	6. day	7. day	8. day
Morning –time								
Morning – number of steps								
Morning –kcal								
Arrival to job (school) – time								
Arrival to job (school) – number of steps								
Arrival to job (school)) – kcal								
Departure from job (school) – time								
Departure from job (school) – number of								
Departure from job (school) – kcal								
Organized PA – beginning – time								
Organized PA – beginning – number of steps								
Organized PA – beginning – kcal								
Organized PA – end – time								
Organized PA – end – number of steps								
Organized PA – end – kcal								
Unorganized PA – beginning – time								
Unorganized PA – beginning – number of								
Unorganized PA – beginning – kcal								
Unorganized PA – end – time								
Unorganized PA – end – number of steps								
Unorganized PA – end – kcal								
Evening – time								
Evening – number of steps								
Evening – kcal								

If you need any assistance, contact us: info-ckv@upol.cz
Or call us: +420585636462

The types and the intensity of all performed physical activities including organized physical activities.

Record the times of all physical activities that you performed during the day **for more than 10 minutes**, (we add together the same activities). Demanding physical activity with high intensity (obvious exhaustion, breathlessness, perspiring, and high heart rate) should be marked with **H** (Hard).

Physical activity	1	2	3	4	5	6	7	8
Walking (including hiking)								
Running (jogging)								
Exercising to music (aerobics)								
Dance								
Basic and Sports Gymnastics								
Fitness exercises, Working out								
"Health" exercises (including morning)								
Swimming								
Downhill skiing								
Cross-country skiing								
Ice-skating (Roller-skating)								
Cycling (including bicycle touring)								
Football, Football-tennis								
Basketball								
Volleyball								
Tennis, soft-tennis								
Table tennis								
Floorball, hockey								
Martial arts								
Gardening								
Work-related physical activity								
Housework								
Others.....................								

The types and intensity of all inactivities.

Record the times (round it to the nearest number that can be divided by five) of all physical inactivities that yoı performed during the day **for more than 10 minutes**, (we add together the same activities).

Physical inactivity	1	2	3	4	5	6	7	8
Sitting (lying) when watching TV								
Sitting (lying) by the computer								
Sitting at school								
Sitting (lying) while learning, playing etc.								
Sitting at parks, restaurants etc.								
Sitting (standing) at sports or cultural events								
Sitting (standing) in transportation vehicles								