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SNATCH

SWIMMING AND NUTRITION AS TOOLS FOR CONTAINING HEALTH

STATE OF ART

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Institute for Symbolic Analysis and Development of Information Technologies

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STATE OF ART

The document State of the Art provides an overview of the state and trends in the field of the influence of physical activity, nutrition and sleep on the health of persons with disabilities. The rapid development of biology and the convergence of biotechnology, nanotechnology and information technologies have shown the increasing influence of a healthy lifestyle on the well-being of people, especially people with disabilities. And this not only on current health, but also on the aging process, which can be resisted with proper nutrition, sleep and adequate physical activity, and in this way, diseases that occur in old age can be avoided. This is extremely important for our fast aging society. However, in order to achieve these positive effects, it is necessary to practice a healthy lifestyle from early childhood.

In the following, we will describe the situation in the individual areas described above.

Before that, we will describe the findings from the article with the provocative title: **Addressing Disability Inequities: Let's Stop Admiring the Problem and Do Something about It**[1]. The article was written by professor dr. James Rimmer, who for the past 30 years has been developing and directing health promotion programs for people with disabilities aimed at reducing obesity, increasing physical activity and improving nutrition in youths, adults and seniors with disabilities. His research and programmatic interests explore the use of new and emergent technologies in developing behavioral and environmental strategies to promote beneficial physical activity and healthful weight management in youths and adults with disabilities. In above mentioned article prof. Rimmer wrote:

»The healthcare system and public health community are often underprepared to support the needs of people with disabilities and to include them equitably in wellness programs (e.g., exercise, leisure, nutrition, stress management) offered to the general community. Consequently, the vast majority of people with disabilities are unable to make the transition from "patient" to "participant," which contributes to many of the health disparities reported in

this population. People with disabilities have a disproportionately higher rate of acquiring secondary conditions such as obesity, cardiovascular comorbidity, pain, fatigue, depression, deconditioning, and type 2 diabetes, often resulting from poor access to home and community-based health promotion/wellness programs that include physical activity, nutrition, stress reduction, and sleep hygiene, among others. Achieving health equity in people with disabilities requires a multi-stage approach that includes person-centered referral to wellness programs, empowering people with disabilities to become self-managers of their own health and ensuring that community-based programs and services are inclusive«

The objectives of S.N.A.T.C.H project are in strong accordance with the statement above.

Physical activity (PA)

There are 1.2 billion persons with disabilities in the world. They represent 15% of the global population and 80% of persons with disabilities reside in low-income countries.[2] Profound or severe disability, meaning the person is unable to perform activities of daily living without assistance, affects 1 in 3 people. The World Bank estimates that one-fifth of the world's population experiences significant disability.

Regular physical activity[3] can:

- improve muscular and cardiorespiratory fitness;
- improve bone and functional health;
- reduce the risk of hypertension, coronary heart disease, stroke, diabetes, various types of cancer (including breast cancer and colon cancer), and depression;
- reduce the risk of falls as well as hip or vertebral fractures; and
- help maintain a healthy body weight.

Physical activity is essential for quality of life of people with disabilities and it has several benefits[3]:

- PA has amplified importance for cognitive, emotional and social difficulties.

- Psychological benefits such as enhanced self-perception through successful PA experiences.
- PA can reduce stress, pain, and depression. Activities of Daily Living (ADLs) are perceived to be easier.

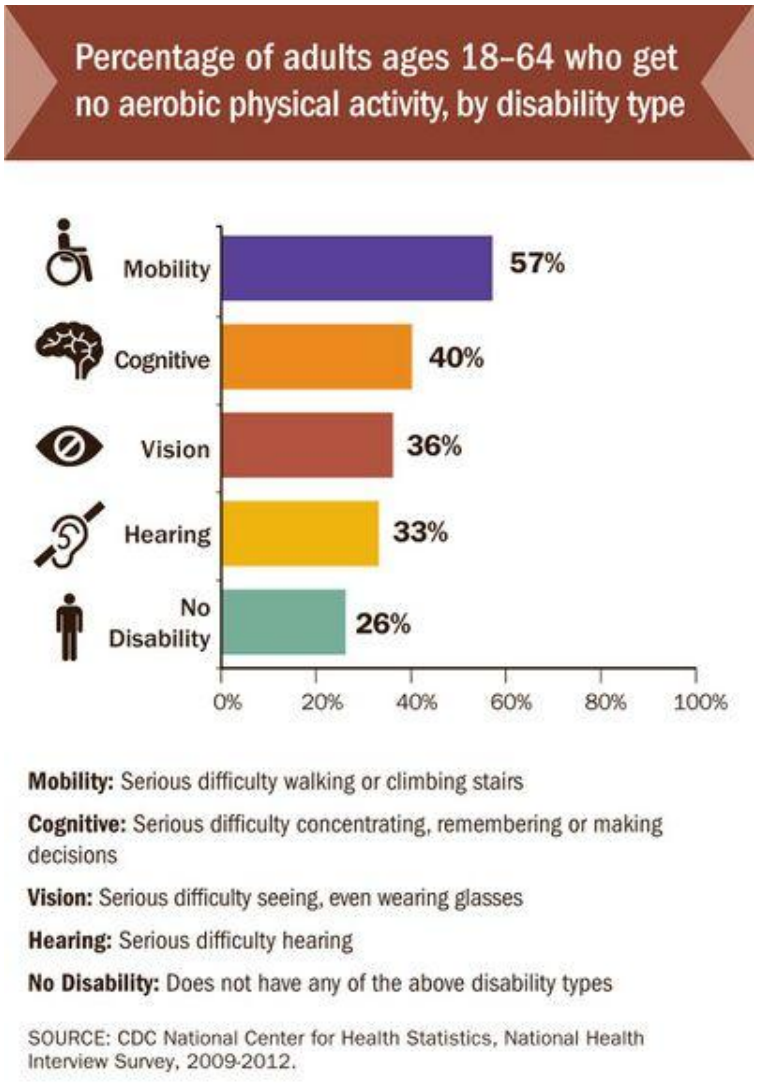
Social contact:

- PA can reduce the stigmatisation process and negative stereotypes.
- PA can contribute to improving social status: non-disabled people see physically active individuals with disabilities more favourably than non-active people.
- Social benefits as the nature of many sports activities leads to increased social integration, bonding and friendship.

Fun:

- PA leads to mood benefits.
- Enjoyment through social interaction of both fitness staff and other participants.

Although there is strong evidence that physical activity generate several benefits to people with disabilities but adults with disabilities only do physical activity on a regular basis [2] about half as often as adults without disabilities (12% compared to 22%) as is shown on image bel



Despite the benefits of particpating in physical activity, there are, , barriers at an individual, social, environmental and policy level[5]:

Individual: lack of knowledge about where to exercise; lack of accessible knowledge/information about physical activity: what benefits there are to being active[6]

Social: dependency of children with disabilities on parents; over-protective others (caregivers, spouses, family); Physical Education teachers lack

professional preparation or equipment to work with students with disabilities; doctors provide medical excuses for students with disabilities to avoid Physical Education.

Environmental: accessibility (too narrow gym doorways for wheelchair access, and inaccessible bathrooms or changing rooms); barriers in outdoor areas (e.g. poorly lit or wooded walking paths, traffic lights lack audible signals).

Policy / Programme: include barriers such as inaccessible or inappropriate or lack of specific programmes for people with disabilities or spinal cord injuries. Lack of staff or trained volunteers / lack of guidance from staff in how to exercise or adapt. Lack of appropriate equipment could also fall into this category. Policy or programme is the least reported barrier but still important. [7]

Being active is good for both physical and mental health. This is why evidence-based recommendations have long existed to advise people on how much exercise, and what type of exercise, they should aim to get each week in order to see these benefits.[8]

But for years, these recommendations largely ignored the needs of people with disabilities. Though physical activity guidelines were devised for adults with disabilities in 2019[9], children and young people were still left unsure of how much physical activity they needed[9].

In the 2022 the UK's first physical activity guidelines for disabled young people aged two to 17. The recommendations we made are based on scientific research and input from disabled young people.[11]

Main recommendations from this document are as follows:

20 minutes of activity each day

The available evidence indicates that, for likely improved health outcomes, it is important for disabled children and disabled young people to participate in 120

to 180 minutes of aerobic physical activity per week at a moderate-to-vigorous intensity. The evidence suggests that this may be achieved in different ways (for example: 20 minutes per day or 40 minutes 3 times per week). There is currently little evidence to support guidelines that disabled children and disabled young people engage in at least a weekly average of 60 minutes per day of moderate-to-vigorous intensity physical activity.

Intensity of physical activity

The available evidence indicated that for likely improved health outcomes, it is important for disabled children and disabled young people to participate in moderate to vigorous intensity activity. Unless training for elite sport as a highly dedicated athlete, intensity was deemed by disabled children and disabled young people, along with many parents and carers in the co-production team, to be an unnecessary, irrelevant and/or confusing message for the infographic to communicate. For example, the disabled children and disabled young people did not monitor or think about intensity when contemplating being active or doing physical activity. Therefore, intensity was not considered a meaningful message which fit with the daily reality of how they wanted to get or stay active. Adding an intensity message also had the potential to confuse the 20 minute message, which was considered more important.

'Small amounts of physical activity are good for you as well'

There is some evidence to suggest there are health benefits from lower amounts of physical activity, therefore some activity is better than nothing. The disabled children and disabled young people, parents, carers, and professionals involved in the co-production process suggested communicating this evidence through a positive, 'gain framed' message. They finessed the message with 'as well' to denote that 20 minutes of activity is good, but that you can also do the physical activity in smaller amounts throughout the day to cumulatively reach 20 minutes.

'When starting build up slowly' and 'ask: can you do this today?'

Concern is often expressed that physical activity for disabled children and disabled young people is not safe. The evidence review that underpins the infographic found no evidence that physical activity presents an adverse risk to most disabled children and disabled young people, if appropriately supervised and tailored to the needs of the individual or group. Messages around 'safety', 'risk', or seeking 'advice from trained professionals' to communicate safety messages were discussed and rejected for inclusion in the infographic because they could be misinterpreted as medicalising disabled children and disabled young people. It could also position them as a vulnerable group and one that health and social care professionals should be overly cautious about promoting physical activity to.

Do challenging but manageable strength and balance activities 3 times per week

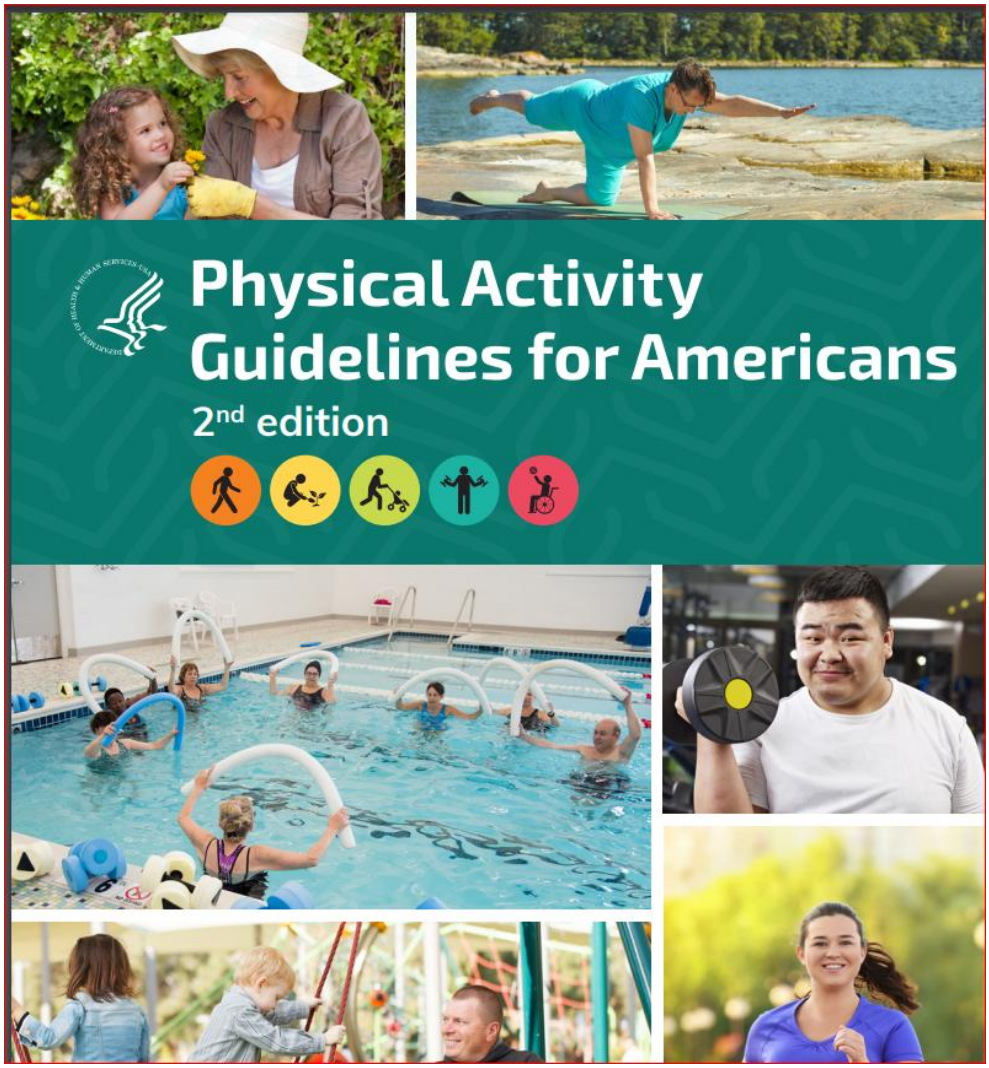
The available evidence base suggests that for good health it is important for disabled children and disabled young people to do challenging strength and balance-focused activities on average 3 times per week. This message was considered very important by the disabled children, disabled young people, parents and carers involved in the co-production process who collectively agreed that good strength and balance are vital for disabled children and disabled young people's quality of life across their life course.

Do bitesize chunks of physical activity throughout the day

There is evidence that small amounts of physical activity are beneficial for health so it was important to communicate that it is still beneficial for disabled children and disabled young people to do a small amount of physical activity throughout the day and/or to break sedentary behaviour.

The message that the co-production team considered most relevant, relatable, and applicable to everyday life was to 'Do bitesize chunks of physical activity throughout the day'. The co-production team chose the word 'bitesize' because they thought it was culturally meaningful and understandable because it was part of their vocabulary learnt through school.

In the well-known document Physical Activity Guidelines for Americans [12]



There is a chapter covering physical activities of people with disabilities, but covering only the needs of adult generation. Main conclusions from section disability and physical activities are as follows:

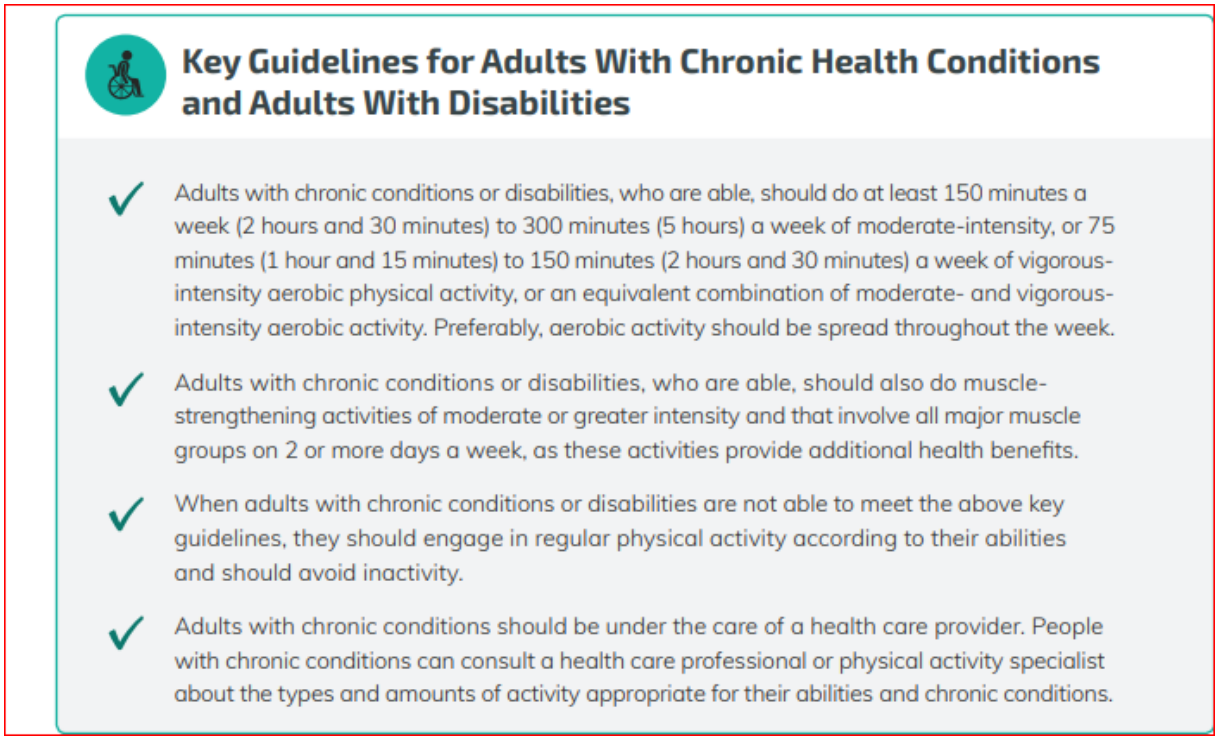
Regular physical activity can help promote improved quality of life for people with chronic conditions and reduce the risk of developing new conditions. The type and amount of physical activity should be determined by a person's abilities and the severity of the chronic condition. For many

chronic conditions, physical activity provides therapeutic benefts and is part of recommended treatment for the condition. However, the Guidelines

does not discuss therapeutic exercise or rehabilitation, except in the context of how physical activity for disease prevention and general health benefits can be done by people with chronic conditions.

The benefits of physical activity for people with disabilities have been studied in diverse groups with disabilities related to traumatic events or to chronic health conditions. These groups include stroke survivors and people with spinal cord injury, multiple sclerosis, Parkinson's disease, muscular dystrophy, cerebral palsy, traumatic brain injury, limb amputations, mental illness, intellectual disability, and Alzheimer's disease and other dementias. Physical activity may improve some aspects of cognition in most diseases or disorders that impair cognitive function.

Overall, the evidence shows that regular physical activity provides important health benefits for people with disabilities. The benefts include improved cardiovascular and muscle fitness, improved brain health, and better ability to do tasks of daily life. Though much remains to be learned about the benefits of activity for specific types of disabilities, sufficient evidence exists to recommend that adults with disabilities should do regular physical activity. The main guidelines are presented on image below:



In the EU document Physical activity strategy for the WHO European Region 2016–2025 [13] there is short paragraph about disability and PA. Here it is

As a consequence, physical inactivity has become a leading risk factor for ill health: 1 million deaths (about 10% of the total) and 8.3 million disability-adjusted life years lost per year in the WHO European Region are attributable to physical inactivity. It is estimated to cause 5% of the burden of coronary heart disease, 7% of type 2 diabetes, 9% of breast cancer and 10% of colon cancer (9). Rising rates of overweight and obesity have also been reported in many countries in the Region during the past few decades. The statistics are disturbing: in 46 countries (accounting for 87% of the Region), more than 50% of adults are overweight or obese; in several of those countries the rate is close to 70% of the adult population. Overweight and obesity are also highly prevalent among children and adolescents, particularly in southern European countries. Physical inactivity has been identified as contributing to the energy imbalance that leads to weight gain.

Collectively, physical inactivity not only has substantial consequences for direct health-care costs but also causes high indirect costs due to increased periods of sickeave, work disabilities and premature deaths. For a population of 10 million people, where half the population is insufficiently active, the overall cost is estimated to be €910 million per year

One of main health problem of people with disability is obesity caused by lack of physical activity and malnutrition. In the study [14]this systematic review and meta-analysis was to determine: (a) the prevalence of overweight/obesity among children and adolescents with intellectual disabilities; (b) the sources of heterogeneity in studies reporting the prevalence of overweight/obesity in this population; and (c) the risk of overweight/obesity in this population compared with their typically developing peers. A systematic literature search was performed and 16 studies, published between 1985 and 2015, met the inclusion criteria. The resulting pooled prevalence estimates for overweight, overweight-obesity, and obesity were respectively (a) 15%, 30%, and 13% in children; and (b) 18%, 33%, and 15% in adolescents. Subgroup analyses showed significant variations in the pooled prevalence estimates as a function of geographic region, recruitment setting, additional diagnoses, and norms used to define overweight or obesity. The findings also showed adolescents with intellectual disabilities to be respectively 1.54 and 1.80 times more at risk of overweightobesity and obesity than typically developing adolescents. Unfortunately, no such comparison is available for children.

In the article[15] obesity of chidren with disability is described. Obesity has become a global epidemic. Worldwide, obesity rates have more than doubled since 1980 and they continue to rise, especially in children with special needs, writes Dietician *Denise Fair.* While so much effort has been made by governments, schools and health care groups around the world, childhood obesity continues to climb at alarming rates. It is estimated (1) that 35% of women and 31% of men are considered seriously overweight or obese, while the figure for children between the ages of 6 and 18 is 15%. The prevalence of

obesity is even higher in children with special needs. When compared to their peers, the obesity rate in girls with special needs is 23% while it is 14% in girls without disabilities. Similarly, for boys the prevalence is 21% for those with disabilities and 17% for those without.[(1) US National Health and Nutrition Examination Survey (NHANES):

Obesity in special needs children, aged 12-18

- 67.1% of teens with autism spectrum disorder were overweight or obese.
- 86.2% of teens with Down syndrome were overweight or obese.
- 18.8% of teens with cerebral palsy were overweight or obese.
- 83.1% of teens with spina bifida were overweight or obese.
- 39.6% of teens with intellectual disability were overweight or obese.
-

The prevalence of obesity in children with disabilities is a concern since they already have more obstacles to overcome than their peers, either physically, mentally or both. Obesity adds another layer of issues, from the physical to the emotional. Children with special needs may be ostracised by their peers and being overweight can add an additional stigma, increasing their risk of both isolation and depression. In addition, extra weight puts a physical strain on joints and muscles, potentially reducing mobility. This is an added dimension for children who may already have issues with movement and physical activity, and which may lead to more weight gain. Obesity can also pose challenges for caregivers as it makes it harder to help children with their daily tasks such as bathing and toileting. Lastly, obesity increases the risk of secondary health problems, such as diabetes, asthma, cardiovascular disease, sleep apnoea, some cancers, stroke and osteoarthritis.

Contributing factors to obesity in the special needs child

- Genetics – some diseases have underlying issues that cause weight gain.
- Behavioural issues – textural, auditory and other sensory issues leading to food selection/rejection.

- Barriers to exercise – the need for specialised equipment, poor coordination and mobility, and physical, sensory and cognitive deficits can prevent a child from being active.
- Medications – 75% of special needs children are on medication, some of which can cause weight gain.
- Mechanical/physical issues – chewing or swallowing difficulties, digestive issues and food intolerance are all more common in special needs children.

Children with developmental or physical disabilities, many of whom face serious health-related conditions, also are affected by the current obesity crisis. Although evidence indicates that children with disabilities have a higher prevalence of obesity than do children without disabilities, little is known of the actual magnitude of the problem in this population. To address this concern, the Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD) held a conference on obesity in children with intellectual, developmental, or physical disabilities, bringing together scientists and practitioners in the fields of obesity and disability to foster collaboration, identify barriers to healthy weight status in populations with disabilities, propose avenues to solutions through research and practice, and develop a research agenda to address the problem. This article describes current knowledge about prevalence of obesity in this population, discusses factors influencing obesity risk, and summarizes recommendations for research presented at the conference.

Obesity prevalence in children and youth with disabilities

An analysis of 2005–2012 NHANES data covering ages 5–17, 2008–2013 NHIS data covering ages 12–17, and 2011 NSCH data covering ages 10–17 years indicates that children and youth with disabilities or special health care needs demonstrate higher rates of obesity than their peers without disabling conditions or special needs (Fig. 1). As assessed by NHANES, children and youth with disabilities were 35% more likely to be obese than peers without disabilities. NHIS data indicate that children with

Disability type and obesity prevalence

All three data sources indicate that children and youth with *mobility limitations* experience higher rates of obesity than children without these

limitations. Obesity prevalence for children and youth limited in their ability to crawl, walk, run, or play is similar for NHANES and NHIS data (NHANES 28.5%, NHIS 28.7%, NSCH 25.7% using slightly different language). Children with *intellectual or developmental disabilities*[8] have much higher rates of obesity in the NSCH (26.7%) and NHIS (22.5%) than

Increased obesity risk in children with disabilities

Little is known about individual and environmental determinants of obesity and their relative contributions in children and youth with disabilities. Yet despite limited data and heterogeneity, it is possible to make assumptions about factors responsible for higher levels of obesity among children and youth with disabilities compared with peers without disabilities. One key factor is that children and youth with disabilities, many with limitations that influence access to physical activity and

The conslusion of study Children with moderate to severe ID visiting specialised day programme centres have high rates of overweight and obesity, and low levels of muscular strength, muscular endurance, and cardiorespiratory fitness. Policies and interventions to increase the physical fitness for this specific group of children are urgently needed,in which increasing motor skills and physical activity should have a central place.

Nutrition

Systematic review[18] of of health promotion programs designed to improve nutrition for people with intellectual disability found that health promotion interventions to date were predominantly at the individual level of the socio-ecological model and of varying effectiveness. Of the non-individually focused interventions, those targeting the physical environment or considering multiple socio-ecological levels achieved the greatest improvements in nutrition outcomes. Nutrition and obesity prevention research and policy need to include intellectual disability as part of equity considerations, while intellectual disability policy needs to consider the broader food environment.

Efficient way to resolve the problem of healthy lifestyle of people with disabilities is use of e-health[19] Children with physical disabilities report higher rates of sedentary lifestyle and unhealthy dietary patterns than non-disabled

peers. To improve health behaviours innovative interventions are needed to assist caregivers of children with physical disabilities . In study the usability and preliminary efficacy of an e-health and telecoaching intervention compared to telecoaching alone was tested. This approach can be very efficient in the case of pandemic or other natural disaster.

Sweden [20]The intervention is designed to suit the ordinary work routines of community residences. It is based on social cognitive theory and takes 12-15 months to complete. The intervention includes three components: 1) Ten health education sessions for residents in their homes; 2) the appointment of a health ambassador among the staff in each residence and formation of a network; and 3) a study circle for staff in each residence. The intervention is implemented by consultation with managers, training of health educators, and coaching of health ambassadors. Fidelity is assessed based on the participation of residents and staff in the intervention activities. The study design is a cluster-randomised trial with physical activity as primary outcome objectively assessed by pedometry. Secondary outcomes are dietary quality assessed by digital photography, measured weight, height and waist circumference, and quality of life assessed by a quality of life scale. Intermediate outcomes are changes in work routines in the residences assessed by a questionnaire to managers. Adults with mild to moderate intellectual disabilities living in community residences in Stockholm County are eligible for inclusion. Multilevel analysis is used to evaluate effects on primary and secondary outcomes. The impact of the intervention on work routines in community residences is analysed by ordinal regression analysis. Barriers and facilitators of implementation are identified in an explorative qualitative study through observations and semi-structured interviews.

There is increasing international interest in the links between malnutrition and disability: both are major global public health problems, both are key human rights concerns, and both are currently prominent within the global health agenda. In this review, interactions between the two fields are explored and it is argued that strengthening links would lead to important mutual benefits and synergies. At numerous points throughout the life-cycle, malnutrition can cause or contribute to an individual’s physical, sensory, intellectual or mental health disability. By working more closely together, these problems can be

transformed into opportunities: nutrition services and programmes for children and adults can act as entry points to address and, in some cases, avoid or mitigate disability; disability programmes can improve nutrition for the children and adults they serve. For this to happen, however, political commitment and resources are needed, as are better data.

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SLEEP

Prof. Dr.M.Walker in bestseller Why we sleep wrote:[22]" I was fond of saying, 'Sleep is the third pillar of good health, alongside diet and exercise.' Ihave changed my tune. Sleep is more than a pillar; it is the foundationon which the other two health bastions sit. Take away the bedrock of sleep, or weaken it just a little, and careful eating or physical exercise become less than effective..."

Here are some facts confirming the statement above. Sleeping less than six or seven hours a night demolishes immune system, increase risk for cancer, and development of Alzheimer disease. Even small reductions in sleep could lead to diabetes, coronary heart disease, weight gain and obesity, weakness of reproductive health.

During the sleep numerous functions of the brain are restored. There are different stage of sleep: light NREM, deep NREM and REM and each offer different brain benefits. If there are not all stages during the sleep the brain impairment will happen.

The NREM stage improves our memory and REM stage foster creativity and problem solving.

There are several types of memory in our brain not only for facts but for motor skills too. Several studies have shown that sleep improves the motor skills athletes in different sports. Fo example research of basketball player in NBA has shown that sleeping more than 8 hours a night generated:

- +12% increase in minutes played
- +29% increase in points/minute
- +2% increase in three-point percentage
- +9% increase in free-throw percentage

On other side sleeping less than 8 hours a night generated:

+37% in turnovers,

+45% increase in fouls committed.

Sleep with Disability is an education service developed by Annie O'Connell that aims to increase the knowledge, skill and confidence of **allied health professionals** and **educators** who support families with children and teenagers with sleep difficulties. Sleep with Disability supports the training of professionals through **SIX online webinars** and links to resources.

- Sleep is an essential part of everyone's daily routine and strongly related to quality of life, learning, health and emotional well-being. Sleep, like diet and exercise, helps us to grow, recover from the wear and tear of daily life and build immunity. While sleeping, the brain sorts and stores memories for future learning.

- Over 80% of children and teenagers with developmental disabilities[23] have disturbed sleep that affects their development, day time behaviour (hyper activity, mood swings, lethargy, aggression & self-injury), learning and health
- A child's inadequate sleep can have a large impact on the whole family with increased emotional and physical stress. Sleep deprived parents and carers find it harder to manage family and work commitments. Parent's own health can be greatly impacted by poor sleep.
- For some children, sleep improves with age. Others continue to experience sleep disturbance into their school years.
- Therapists and educators can support families to develop better sleeping patterns for their children with a family centered individualised sleep plan.

Individuals with intellectual and developmental disabilities (IDD) experience sleep problems at higher rates than the general population[24]. Although individuals with IDD are a heterogeneous group, several sleep problems cluster within genetic syndromes or disorders. This review summarizes the prevalence of sleep problems experienced by individuals with Angelman syndrome, Cornelia de Lange syndrome, Cri du Chat syndrome, Down syndrome, fragile X syndrome, Prader-Willi syndrome, Smith-Magenis syndrome, Williams syndrome, autism spectrum disorder, and idiopathic IDD. Factors associated with sleep problems and the evidence for sleep treatments are reviewed for each neurodevelopmental disorder. Sleep research advancements in neurodevelopmental disorders are reviewed, including the need for consistency in defining and measuring sleep problems, considerations for research design and reporting of results, and considerations when evaluating sleep treatments

Down syndrome and sleep

Children and adults with Down syndrome have a high likelihood of having sleep problems.

This includes poor sleep quality and reduced overall sleep time, less deep sleep and more sporadic awakenings during the night.

Children with Down syndrome can also experience bedtime anxiety, or may even be resistant to going to bed.

Common sleep disorders of a child with Down syndrome include sleep talking, sleep apnea, bedwetting, insomnia, rhythmic movement disorder and night time teeth grinding.

A large percentage of children with Down syndrome have sleep apnea due to physical factors from the disorder.

It's important to get on top of sleep apnea fast for a child with Down syndrome, because it can become quite deadly if a child has reduced oxygen in the body, causing brain damage and aggravating congenital heart defects.

A Autism Spectrum Disorder and sleep

A large majority of adults and children with Autism Spectrum Disorder (ASD) have problems with falling asleep or remaining asleep.

A child with Autism can experience abnormal "circadian" rhythm, mental health issues like anxiety or depression, or epilepsy, which can have a big impact on sleep.

ASD medication can also have a bad effect on sleep patterns or even cause daytime drowsiness.

Since Autism already has an influence on behaviour, adding in poor sleep can have a direct impact on a person with Autism's concentration, mood and behaviour.

Children with Autism have a large likelihood of developing a sleep disorder, like insomnia, bedwetting, nightmares or night terrors.

Tips for improving sleep

The best options for improving sleep for a child or adult with disability is to make sure you maintain a routine for bed.

Try making the bedroom an idle environment for sleep and avoid any food that may impact sleep or cause hyperactivity.

Implementing relaxation methods or downtime, like meditation, can help with preparing your body for night time. This includes reduced computer or phone screen time.

If you are starting to feel exhausted every day, visit your GP or any medical professional to see if there may be an underlying health problem impacting your sleep.

What do you do to make sure you get enough sleep? Tell us in the comment section below.

Sleep is now widely recognised as fundamental to the general health and wellbeing of everyone. But it's especially important for children and teenagers – research has linked lack of sleep and poor sleep-quality to impaired learning, obesity, depression and many other mental health conditions.

Sound Sleep is an education programme that raises awareness in schools of the importance of sleep for health and wellbeing, and helps pupils implement positive sleep habits in their routines. Developed by Sleep Scotland, Sound Sleep Primary (launched 2018) and Sound Sleep Secondary (launched 2011) consists of a training day and teaching resource pack for professionals working in either Primary or Secondary schools.[24]

Further reading

Read more about Sound Sleep, and look at some sample resources.

For Schools

Sound Sleep is an education programme that raises awareness in schools of the importance of sleep for health and wellbeing, and helps pupils implement positive sleep habits in their routines. Developed by Sleep Scotland, Sound Sleep Primary (launched 2018) and Sound Sleep Secondary (launched 2011)

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Why raise awareness?

Getting the right amount of sleep is as important as eating a healthy diet and exercising regularly. We place strong emphasis on teaching our youngsters about diet and exercise for the good of their health and wellbeing – **why don't we do the same for sleep?**

Sleep deprivation is a very real and very serious issue affecting a far greater number of both primary and secondary school students than we think. Look at the results of a simple survey we carried out with 785 teenagers across Scotland (1):

- **19% felt satisfied** with their sleep every night.
- **34% said** they had an extremely hard time falling asleep almost every night.
- **50% said** they felt tired or dragged out nearly every day.

Research has linked poor sleep quality and lack of sleep to obesity, depression and impaired learning. Many teenagers are falling far short of the amount of sleep they need each night – which can have a hugely detrimental effect on their physical and mental health. The Mental Health Foundation has stated that **"sleep deprivation is a seriously neglected health issue in our population"**.

Did you know that:

- Four-year-olds with sleep difficulties have an increased risk of developing mental health problems as early as six.
- Childhood insomnia has also been linked to problems with aggression and anxiety later in adolescence
- Young people sleeping less than 8 hours a night are 3 times more likely to attempt suicide.
- The risk of self-harming has been found to be 4 times higher among 16 to 19 year olds with insomnia.

As well as these health implications, there are strong indications that sleep deprivation affects memory consolidation and, as a result, the ability to retain information – a major drawback for any child or teenager at school.

A primary school which took part in our Sound Sleep programme as part of the pilot, reported a difference in their pupil's ability to concentrate, ability to cope, and a huge fall in absenteeism. One student's attendance rose from **53% to 94%**. (2)

School and sleep deprivation

As well as demonstrating the effects of sleep deprivation, Sleep Scotland has found that general knowledge about sleep is lacking. When 247 high school pupils were asked to fill out a short quiz about sleep (3):

- **87% believed** that lack of sleep does not affect aspects of your health.
- **90% believed** that teenagers do not need more sleep than adults.
- **91% believed** that you can miss out on a few hours of sleep and 'make it up' over the weekend.

Without the knowledge of what is meant by healthy sleep and the benefits of getting it, we cannot expect our children and adolescents to know what a good night's sleep is — let alone how to get one. The Sound Sleep education programme aims to tackle this lack of knowledge, and transform it into healthy sleeping behaviour.

https://www.scope.org.uk/advice-and-support/help-disabled-child-sleep/

In the bedroom

- Put away or cover toys, bright colours and noisy items from the bedroom to make it feel calm.
- Make sure the bedroom is dark enough. Use Velcro blackout kits or blackout blinds to keep light out.
- The best temperature is 16 to 18 degrees Celsius, but try to find out what your child finds comfortable.

- Lie on your child's mattress to see if it's comfortable. If possible, ask how it feels to your child.

Physical

https://www.camhsnorthderbyshire.nhs.uk/learning-disabilities-sleep-problems

Sleep is the natural state of bodily rest observed in humans and animals. Regular sleep is often understood as a process of restoration needed for our survival.

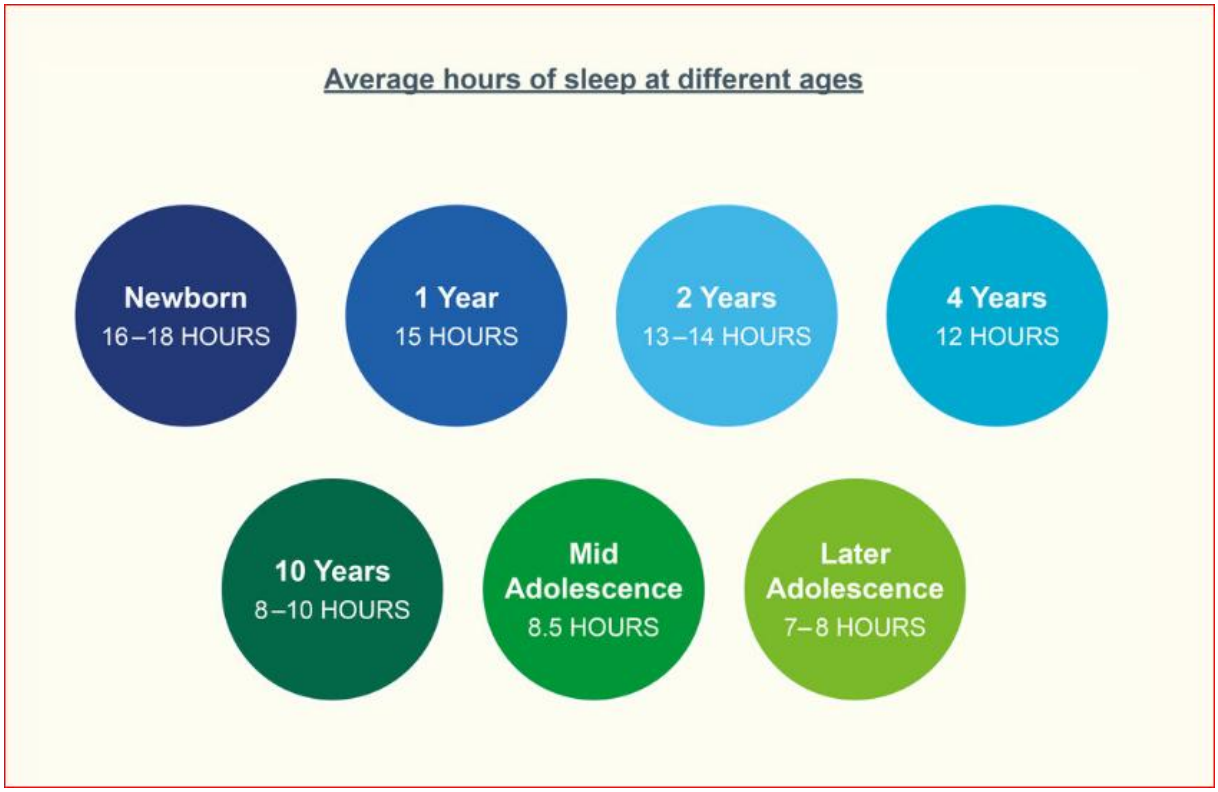
Sleep problems are particularly common in children and adolescents with learning disabilities and these problems tend to fall into one of three categories:

- Difficulty getting to sleep or staying asleep.
- Sleeping too much.
- Disturbed episodes that interfere with sleep.

Factors which are thought to affect sleep include physical and psychological factors. Examples of physical factors include breathing problems, epilepsy, and physical discomfort at night. Examples of psychological factors include anxiety, low mood, and over-activity (e.g. ADHD).

Sleep problems in children and young people with learning disabilities tend to impact upon the whole family and can often affect all family members' wellbeing. In addition, sleep problems can have various effects on the young person themselves. For example, the young person may experience daytime sleepiness resulting in an impaired performance at school. The young person may also experience irritability and behavioural problems due to sleep deprivation.

Thankfully, sleep problems in children and young people are treatable with appropriate and well-considered approaches.



Principles of sleep hygiene for children and adolescents

ENVIRONMENT CONDUCIVE TO SLEEP

- Familiar setting.
- Comfortable bed.
- Correct temperature (many children wake in the night because they are either too hot or too cold).
- Darkened, quiet room.
- Non-stimulating.
- No negative associations (e.g. punishment).

BEDTIME ROUTINE

- Introduce a pleasant bedtime routine; which could be something like "wash, change, then bedtime story".
- Visual timetables can be used to indicate each part of the bedtime routine; they ensure consistency, familiarity and can aid the child's understanding.
- Consistent bedtime and waking-up times.

THINGS TO ENCOURAGE

- Going to bed only when tired.
- Thinking about problems and plans before bedtime. For anxious children it can be useful to talk through any concerns and plans for the next day, to help alleviate any worries about this.
- Falling asleep without parents.
- Regular daily exercise.

THINGS TO AVOID

- Excessive or late napping during the day.
- Overexcitement near bedtime.
- Late evening exercise.
- Caffeine-containing drinks late in the day.

What treatments are available?

BEHAVIOURAL APPROACHES

Behavioural treatments are commonly used successfully for treating children with learning disabilities. These require a specialist to observe the child over a period of time to help identify possible causes. It is also important for the specialist to talk with parents in order to develop a greater insight into the child's sleep problems.

Possible interventions could be:

- For children who struggle to settle – work on conditions that encourage sleep (e.g. a bedtime routine, relaxation skills).
- For children who struggle to settle without parents – parents gradually increase the physical distance between themselves and the child at bedtime.
- For children who find it difficult to stay in their own bed – positively reward the child with something they like (e.g. watch a film, praise) for staying in bed during the night.

PHARMACOLOGICAL APPROACH

- Some children may benefit from medication, such as hypnotics or melatonin. A qualified Psychiatrist or Paediatrician would be able to provide you with more information.
- Managing behaviour and sleep problems in disabled children: An investigation into the effectiveness and costs of parent-training intervention

References:

1. Rimmer JH. Addressing Disability Inequities: Let's Stop Admiring the Problem and Do Something about It. Int J Environ Res Public Health. 2022 Sep 20;19(19):11886. doi: 10.3390/ijerph191911886. PMID: 36231189; PMCID: PMC9565910.

2. https://www.physio-pedia.com/Physical_Activity_in_Individuals_with_Disabilities
3. https://www.who.int/news-room/fact-sheets/detail/physical-activity
4. https://www.researchgate.net/publication/239940663_Benefits_and_barriers_to_physical_activity_for_individuals_with_disabilities_A_social-relational_model_of_disability_perspective.
5. Jaarsma EA, Dijkstra PU, Geertzen JHB, Dekker R. Barriers to and facilitators of sports participation for people with physical disabilities: A systematic review. 2014. Scandinavian Journal of Medicine & Science in Sports, 24 (6), 871-881.
6. Wadey R, Melissa Day M. A longitudinal examination of leisure-time physical activity following amputation in England.Psychology of Sport and Exercise 2018; 37: 251-261
7. Vermaak, C. Spinal Cord Injury - Benefits, Barriers and Guidelines for Physical Activity. Plus Course. 2022.
8. https://theconversation.com/how-much-exercise-should-disabled-young-people-get-new-recommendations-offer-advice-177020.
9. https://www.gov.uk/government/collections/physical-activity-guidelines.
10. C. Physical activity for general health in disabled children and disabled young Smith B, Rigby B, Netherway J, Wang W, Dodd-Reynolds C, Oliver E, Bone L and Foster people: summary of a rapid evidence review for the UK Chief Medical Officers' update of the physical activity guidelines. Department of Health and Social Care: London, UK. 2022.
11. https://www.gov.uk/government/publications/physical-activity-guidelines-for-disabled-children-and-disabled-young-people-methodology/uk-chief-medical-officers-physical-activity-guidelines-for-disabled-children-and-disabled-young-people-methodology.
12. https://health.gov/sites/default/files/201909/Physical_Activity_Guidelines_2nd_edition.pdf.

13. Xc
14. Maïano C, Hue O, Morin AJ, Moullec G. Prevalence of overweight and obesity among children and adolescents with intellectual disabilities: a systematic review and meta-analysis. Obes Rev. 2016 Jul;17(7):599-611. doi: 10.1111/obr.12408. Epub 2016 May 12. PMID: 27171466
15. https://www.playtimes.com.hk/obesity-and-the-special-needs-child/
16. Bandini L, Danielson M, Esposito LE, Foley JT, Fox MH, Frey GC, Fleming RK, Krahn G, Must A, Porretta DL, Rodgers AB, Stanish H, Urv T, Vogel LC, Humphries K. Obesity in children with developmental and/or physical disabilities. Disabil Health J. 2015 Jul;8(3):309-16. doi: 10.1016/j.dhjo.2015.04.005. Epub 2015 May 7. PMID: 26058685.
17. Marieke Wouters, Heleen M. Evenhuis & Thessa I. M. Hilgenkamp (2020) Physical fitness of children and adolescents with moderate to severe intellectual disabilities,Disability and Rehabilitation, 42:18, 2542-2552, DOI: 10.1080/09638288.2019.1573932.
18. Dean S, Marshall J, Whelan E, Watson J, Zorbas C, Cameron AJ. A Systematic Review of Health Promotion Programs to Improve Nutrition for People with Intellectual Disability. Curr Nutr Rep. 2021 Dec;10(4):255-266. doi: 10.1007/s13668-021-00382-0. Epub 2021 Dec 10. PMID: 34893970.
19. Wingo BC, Yang D, Davis D, Padalabalanarayanan S, Hopson B, Thirumalai M, Rimmer JH. Lessons learned from a blended telephone/e-health platform for caregivers in promoting physical activity and nutrition in children with a mobility disability. Disabil Health J. 2020 Jan;13(1):100826. doi: 10.1016/j.dhjo.2019.100826. Epub 2019 Aug 1. PMID: 31416771; PMCID: PMC6901757.

20. Elinder LS, Bergström H, Hagberg J, Wihlman U, Hagströmer M. Promoting a healthy diet and physical activity in adults with intellectual disabilities living in community residences: design and evaluation of a cluster-randomized intervention. BMC Public Health. 2010 Dec 13;10:761. doi: 10.1186/1471-2458-10-761. PMID: 21144033; PMCID: PMC3020685.
21. Groce N, Challenger E, Berman-Bieler R, Farkas A, Yilmaz N, Schultink W, Clark D, Kaplan C, Kerac M. Malnutrition and disability: unexplored opportunities for collaboration. Paediatr Int Child Health. 2014 Nov;34(4):308-14. doi: 10.1179/2046905514Y.0000000156. Epub 2014 Oct 13. PMID: 25309998; PMCID: PMC4232244.
22. Walker M. Why we sleep (2017), *Why we sleep.* Simon & Schuster.
23. https://www.sleepwithdisability.com/
24. https://www.disabilitysupportguide.com.au/information/article/importance-of-sleep-for-people-with-disability
25. https://sleepscotland.org/