Inclusive Healthy Lifestyle Groups in Schools
Special Olympics

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Inclusive Healthy Lifestyle groups in schools: Application for Individuals with Intellectual Disabilities

According to the World Health Organization (WHO), the Healthy Lifestyle (HL) is perceived as a way of living, a way that prevents the hazards of being ill or even dying at an early age. Several studies have reported the importance of healthy lifestyle in children and adults, through the adoption of certain behaviors leading to an advancement of individual's physical, mental and psychosocial well-being. The behaviors associated with healthy lifestyle and healthy living are mainly the engagement in physical activity, healthy eating, avoidance of consuming certain substances (e.g. tobacco, alcohol products) and sedentary behaviors. In the literature review, recent studies in the field will be reported for individuals with intellectual disabilities (ID).

Physical Activity, Inclusion, Intellectual Disability

Inclusion refers to the right of all individuals, regardless of their ability or disability, for participation and interaction with peers in several daily activities. The aim of the activities is to promote, among others, their well-being as valuable members of their communities (IDEA, 1990). The inclusive trend has been established in several federal laws, such as the Americans with Disabilities Act (ADA) in the USA, leading to a ban of discriminative acts based on disability. Ever since, districts, communities and schools are encouraged to provide equal opportunities for participation in several aspects of daily living (such as employment, recreation, physical activity and sports) to every individual involved, regardless of disability status.

Intellectual disabilities (ID) are placed under the umbrella of neurodevelopmental disorders and refer to limitations in adaptive and intellectual functioning. The ID is initiated during the developmental stage, is lifelong (Lloyd et al, 2022) and affect participation in several activity areas, such as independent living, personal care, socialization, etc. (O'Leary et al, 2018).

Physical activity (PA) in turn, refers to the movement produced by wide muscle groups, requiring certain energy expenditure. PA refers to all movements during leisure time or during organized sports and exercise, such as walking, running, weight training, playing sports and may be exerted at any skill level for enjoyment, maintain or improving physical fitness and/or performance (WHO, 2023). The international guidelines suggest an average of 30 minutes/day for adults and 60 minutes/day for children and adolescents. The WHO suggested that regular involvement in PA may prevent and manage several diseases (e.g. heart diseases, diabetes, hypertension), maintain proper body weight and improve well-being and quality of life for the individuals involved.

According to the IDEA (1990), only 24% of individuals with disabilities, in general, acquire the international guidelines for engagement in daily physical activity and sports. In turn, Dairo et al (2016) reported that only 9% of individuals with ID meet the respective PA guidelines. Despite the inconsistency of the above figures, the literature has consistently reported that individuals with ID experience elevated risks for several health problems associated with physical inactivity (Draheim et al, 2002; Fernhall et al, 2001). The physical inactivity is attributed to their sedentary lifestyle (Frey et al, 2008; Graham & Reid, 2000; Hoge & Dattilo, 1995) and may impact their morbidity and mortality rates (Sutherland et al, 2002). Common reported health problems are the increased rates of diabetes, elevated cholesterol and blood pressure, obesity and decreased physical fitness (O'Leary et al, 2018; Rimmer & Braddock, 2002; Rimmer, Braddock & Fujiura, 1993). The physical fitness in particular has been examined in depth and the consistent research findings suggested that the individuals with ID do not meet the general fitness criteria (Stanish et al, 2006) and are less fit compared to the 'general' population (Temple et al, 2006). Finally, Skowronski, et al. (2009) claimed that a continuing pattern of low fitness is evident for individuals with ID, with a faster decline in fitness over the life-span, compared to the 'general' population, leading to an increased risk of related health problems.

McGarthy et al., (2018) reported in a systematic review and meta-analysis the effect of interventions to increase the physical activity (PA) levels of children and adolescents with intellectual disabilities (ID). The researchers reported that the interventions were not more effective for increasing the PA compared to

control conditions, while a moderate but significant effect was evident during follow up assessments. McGarthy et al (2018) concluded that more research is of paramount importance before recommendations for PA are prescribed.

Similarly, Hassan et al., (2019) examined, in a systematic review, the interventions for increasing PA in individuals with ID. The researchers reported substantial benefits in a variety of programs and claimed that more research is required to draw permanent conclusions (Hassan et al, 2019).

Sutherland et al (2021) examined, in a systematic review, the correlates of PA in children and adolescents with Down syndrome. The researchers reported that motor development was the dominant variable associated positive with the engagement in daily PA (Sutherland et al, 2021).

Finally, Gonzalez-Aguero et al., (2010) examined, in a review, the response to training and the physical fitness of children and adolescents with Down syndrome. The researchers found a trend of low physical fitness and body composition in the participants with Down syndrome, compared to their counterparts (a: without ID and b: with ID without Down syndrome). Gonzalez-Aguero et al (2010) concluded that more evidence is still required since the reasons for low engagement in physical activity and low fitness are still unknown.

Assessment

The assessment of physical activity will be held with certain measures appeared in the literature, with all incorporating acceptable validity and reliability evidence. These measures assess aerobic capacity, explosive strength, muscular endurance, body composition, flexibility etc. and may be found in the Eurofit manual (Grgic, 2023). They were selected because they are user friendly, easy to administer and do not require a long time to complete. All assessments will be held during the day, between 9:00 and 15:00 hours, in a safe environment. The participants will were sports clothes throughout, with the exception of the anthropometric measures (height and weight). A standardized 10 minute warm up session will be held, with mild exercises and stretching activities (music is encouraged) (Ranson, Stratton, & Taylor, 2015).

Accordingly, the following assessments will be held:

AEROBIC CAPACITY

The six-minute walk test (6MWT) will be used to assess aerobic capacity. It was introduced in 2002, by the American Thoracic Society, and assesses the distance covered by the examinees over a period of six minutes. The 6MWT may be used to assess children, adolescents, adults and senior citizens, either without or with a variety of disabilities. Further, it has been used in the past successfully with individuals with intellectual disability (ID) (e.g. Nasuti, Stuart-Hill & Temple, 2013; Guerra-Balic et al, 2015; Janssens & Jolie, 2018). Following the guidelines of Janssens and Jolie (2018), the participants with ID have to cover the widest possible distance in six minutes. The researchers (Janssens & Jolie, 2018) incorporated the instructions provided by the American Thoracic Society as follows: ‘Walk as far as you can during six minutes’, ‘passing others is allowed’, ‘running is not permitted’, at the end you will hear a whistle’, ‘at the end, you have to stay on that place’. The assessments were conducted in the gym. After the initial explanation, an assessor exhibited one lap. The children with ID walked in a rectangle (corners were marked with cones). Another assessor counted the number of times the participants crossed the marked starting line. At the end of the six minutes, they had to stop and stay on that spot. Accordingly, the assessors marked their position on the ground. The distance covered from the starting line to their finishing point was also counted and added, rounded off to one decimal (in meters). The participants could pause during the 6 minutes if they felt they could not continue walking (felt exhausted). They were also encouraged to restart as soon as possible, since the clock was not interrupted during the assessment. The participants were further encouraged during the assessment and corrected if necessary.

ANTHROPOMETRIC

Weight: The participant's weight will be measured in Kilograms with an electronic weight measure. Participants are measured with their athletic equipment (t-shirt and shorts) but without shoes, into their respective training area.

Height: A tape measure is attached vertically in the wall, with the starting 0 point at the floor level. The participants are required to stand next to the tape, without shoes, and keep their head and eyes looking straight forward. The examiner places his/her hand at the top of the head. Then the examiner moves his/her hand horizontally towards the tape measure. The point where the tape measure and the hand are met, represents the final height score.

BMI: The body mass index (BMI) is estimated from the ratio of the weight (in Kgs) to their respective squared height (in meters).

FLEXIBILITY

The Sit and Reach Test: To undertake the test, a table or box is required, 35 cm long, 45 cm wide, 32 cm high, with a superposed top plate 55 cm long, with a scale 0-50 cm marked on it (e.g. every 5 cm). The starting position is sitting on the floor with shoes removed, feet flat against the table, and legs straight. The instruction is to reach forward and push the fingers along the table as far as possible and hold this position at least for a count of two. The distance from the finger tips to the edge of the table represents the score for the participants. Several warm-up attempts are conducted and the best score of the two final trials is recorded.

MUSCULAR ENDURANCE

Sit-up test: The participants perform as many bent knee sit-ups as possible within 30 seconds. The participants are encouraged to perform one or two trial repetitions before test. The knees are bent 90°; the feet are flat on the floor with arms and at sides and palms down. The participants perform sit up each time raising head, shoulders and shoulder blades off the floor reaching for knees and lowers back to the floor.

Push-ups test: The participants place toes on the floor with the knees extended and hands on the floor with the elbows extended and perform as many push-ups as possible within 30 seconds. The participants perform full push-ups each time lowers his body flexing the elbow and the returns to the initial position extending the elbows. The participants are encouraged to perform one or two trial repetitions before test.

MUSCLE POWER

Standing long jump test: Jumping for distance from a standing start. The participants stand with feet shoulder width apart, bends knees with arms in front parallel to the ground, swings both arms and pushes off vigorously and jump as far as possible. The test requires landing with feet together and to stay upright. A second trial is conducted if the participants stumble or fall during the first trial.
The distance is measured from the front edge of the take-off line to the point where the back of the heel nearest to the take-off line lands on the mat.

AGILITY

Shuttle run: The test involves running between two lines 15.24 meters apart. Starting from the start / finish line, the participant runs to the end line, picks up a block and runs with the shuttle block back across the start/ finish line. The time required for the trial is recorded. A second trial is conduced only if the participant falls, fails to pick up the shuttle block before crossing the start/ finish line during the first trial.

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Sedentary Lifestyle and Intellectual Disability

Individuals with intellectual disabilities are at an increased risk of leading a sedentary lifestyle due to several reasons, including limited opportunities for physical activity, lack of social support, and health-related issues. A sedentary lifestyle can have significant negative impacts on their physical health, leading to obesity, cardiovascular diseases and type II diabetes (Yuan et al., 2022).

It has been observed that physical activity levels decline while sedentary behavior, screen time, and unhealthy dietary habitsi ncrease, both in the general population and in people with disabilities (Amatori, 2022). It is probable that these unfavorable behavior patterns observed during childhood and adolescence will persist throughout adulthood. Children and adolescents may gain more health-related advantages by simultaneously increasing their moderate-to-vigorous physical activity and decreasing their sedentary behavior (Shen et al., 2020). In addition, the World Health Organization advises that children and teenagers aged 5 to 17 should engage in at least 60 minutes of moderate-to-vigorous physical activity daily while keeping sedentary behavior to less than 2 hours per day (WHO, 2020).

Physical inactivity is a global concern, but the use of different measures for physical activity makes it difficult to compare data internationally. To address this issue, the International Physical Activity Questionnaire (IPAQ) was developed as a tool to monitor physical activity and inactivity across countries. The IPAQ instruments were created by an International Consensus Group between 1997 and 1998, resulting in four long and four short forms. These instruments could be administered through telephone interviews or self-administration, with two options for reference periods: the "last 7 days" or a person's "usual week" of recalled physical activity. In the year 2000, 14 centers in 12 countries collected reliability and validity data for at least two of the eight IPAQ instruments. The test-retest repeatability was assessed within the same week, while the concurrent validity was assessed during the same administration, comparing the IPAQ results with data from the CSA (now MTI) accelerometer. The study reported Spearman's correlation coefficients based on the total reported physical activity. Overall, the IPAQ questionnaires provided consistent data (with Spearman's coefficients around 0.8), and the short and long forms produced comparable results.

The criterion validity, comparing the IPAQ with the accelerometer, had a median correlation of about 0.30, similar to other self-report validation studies. The "usual week" and "last 7 days" reference periods showed similar performance, and the reliability of telephone administration was comparable to self-administration. In conclusion, the IPAQ instruments have satisfactory measurement properties, at least as good as other established self-report methods. Considering the diverse samples in this study, the IPAQ is a suitable tool for monitoring physical activity levels among adults aged 18 to 65 in different settings. The short IPAQ form using the "last 7 days recall" is recommended for national monitoring, while the long form is more appropriate for research requiring more detailed assessment (Craig et al., 2003).

Furthermore, the International Physical Activity Questionnaire - Short Form (IPAQ-SF) has been recommended as a cost-effective method for assessing physical activity. Studies published in English validated the IPAQ-SF against objective measures of physical activity, such as doubly labeled water or objective fitness measures. A total of 23 validation studies were included and while the methods used varied across studies, the overall results were largely consistent. The correlations between the IPAQ-SF's total physical activity level and objective standards ranged from 0.09 to 0.39, falling below the minimal acceptable standard set in the literature (0.50 for objective activity measuring devices and 0.40 for fitness measures). Correlations for specific sections of the IPAQ-SF, such as vigorous activity or moderate activity level/walking, showed even greater variability (-0.18 to 0.76), with some reaching the minimal acceptable standard. Only six studies provided comparisons between physical activity levels derived from the IPAQ-SF and those obtained from objective criteria. In most studies, the IPAQ-SF tended to overestimate physical activity levels by 36 to 173 percent, with one study underestimating by 28 percent. The correlation between the IPAQ-SF and objective measures of activity or fitness in the majority of studies was lower than the acceptable standard. Consequently, the evidence supporting the use of the IPAQ-SF as an indicator of relative or absolute physical activity is weak (Lee et al., 2011).

Moss and Czyz (2016) examined the agreement between objective physical activity (PA) data measured by ActiHeartVR and subjective proxy-respondent data obtained from the International Physical Activity Questionnaire short version (IPAQ-S), in adults with intellectual disabilities (ID). A total of fifty-eight participants wore ActiHeartVR monitors continuously for seven days, while caregivers completed the IPAQ-S on behalf of each participant. The IPAQ-S and ActiHeartVR were used to assess total PA, time spent in light, moderate, and vigorous activity, as well as sedentary behavior. Correlation analyses were conducted to compare the results. The objective PA measured by ActiHeartVR (225.57 ± 91.96 min/week) was higher than the PA reported by caregivers using the IPAQ-S (177.06 ± 309.17 min/week). Weak significant correlations were observed between ActiHeartVR and IPAQ-S for sedentary behavior, but no significant correlations were found for light, moderate, or vigorous PA. The study revealed limited agreement between objectively measured PA using ActiHeartVR and the IPAQ-S.

Menezes, Laranjo and Marmeleira (2016) examined the criterion validity of the short form of the International Physical Activity Questionnaire (IPAQ-S) in deaf adults. The study included 44 adults of both genders, aged 18 to 65 years, who met the inclusion criteria. Objective measures of physical activity (PA) were collected using accelerometers worn by each participant for one week. Following accelerometer usage, the IPAQ-S was administered to assess participants' physical activity during the last 7 days. The study found no significant correlation between the average time spent in moderate to vigorous physical activity (MVPA) as measured by the accelerometer (40.1 ± 24.5 min/day) and the IPAQ-S (41.3 ± 57.5 min/day). The IPAQ-S significantly underestimated the time spent in sedentary behavior (7.6 ± 2.7 h/day vs. 10.1 ± 1.6 h/day). There was limited agreement between sedentary behavior and MVPA as measured by the accelerometer and the IPAQ-S. These findings suggested limitations in using the IPAQ-S to quantify physical activity among deaf adults. The IPAQ-S tends to overestimate MVPA and underestimate sedentary behavior in this population.

Assessment

International Physical Activity Questionnaire (IPAQ)

Information of sedentary behavior will be obtained through a questionnaire (IPAQ) covering physical activity retrospectively. This measure assesses the types of intensity of physical activity and sitting time that people do as part of their daily lives in MET-min/week and time spent sitting. The IPAQ may be administered in person or over the phone, and involves recalling physical activity and sedentary behaviors during the past seven days. It captures the time spent walking, engaging in vigorous and moderate-intensity activity, as well as time spent in sedentary activities. In general, it covers engagement in all types of physical activity, including activities performed for work, housework, yard work, transportation, and leisure activities such as recreation, exercise, or sports. The participants will need to report the amount of time they spend sitting at work, home, during coursework, leisure time (including watching television), and time spent in a motor vehicle.

The target population is youth 15 years of age and older. It is available in English and many other languages. The International Physical Activity Questionnaire (IPAQ) Short Form is the most commonly used instrument, which includes a question that asks participants to report how much time they spent sitting on a weekday during the last seven days, in hours and minutes per day.

To collect data on sedentary behavior, the participants will be directed to reflect on the time they spent sitting at various activities such as work, home, coursework, and leisure time. The duration of sitting time has been employed as a specific indicator of sedentary behaviors during waking hours, as supported by studies such as Owen et al. (2010) and Jose´ Marmeleira, Luı´sLaranjo, Olga Marques, and NunoBatalha (2013).

The purpose of IPAQ-Gr is to generate a total physical activity score (PAscore) expressed in MET-minutes per week (MET.min.wk-1) by combining the time spent on vigorous, moderate, and walking physical activities during the previous seven-day period. The IPAQ scoring method classifies physical activity status into three categories (PAclasses): (1) low PAclass, representing individuals who are insufficiently active (total PAscore < 600 MET.min.wk-1); (2) moderate PAclass; and (3) high PAclass, indicating involvement in health-enhancing physical activity (HEPA), which in turn is defined as total

PAscore ≥ 3000 MET.min.wk-1 or vigorous PAscore ≥ 1500 MET.min.wk-1. Test-rest reliability indicated stability and consistency evidence (α <.80).

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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** 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. Think *only* about those physical activities that you did for at least 10 minutes at a time.

1. During the **last 7 days**, on how many days did you do **vigorous** physical activities like heavy lifting, digging, aerobics, or fast bicycling?

   _____**days per week**

   ☐ No vigorous physical activities ➡ ***Skip to question***

2. How much time did you usually spend doing **vigorous** physical activities on one of those days?

   _____**hours per day**

   _____**minutes per day**

   ☐ Don't know/Not sure

Think about all the **moderate** activities that you did in the **last 7 days**. Moderate activities refer to activities that take **moderate** physical effort and make you breathe somewhat harder than normal. Think only about those physical activities that you did for at least 10 minutes at a time.

3. During the last 7 days, on how many days did you do moderate physical activities like carrying light loads, bicycling at a regular pace, or doubles tennis? Do not include walking.

   _____**days per week**

   ☐ No moderate physical activities ➡ Skip to question

4. How much time did you usually spend doing **moderate** physical activities on one of those days?

   _____**hours per day**

   _____**minutes per day**

   ☐ Don't know/Not sure

Think about the time you spent **walking** in the **last 7 days**. This includes at work and at home, walking to travel from place to place, and any other walking that you have done solely for recreation, sport, exercise, or leisure.

5. During the **last 7 days**, on how many days did you **walk** for at least 10 minutes at a time?

_____days per week

☐ No walking ➡ ***Skip to question 7***

6. How much time did you usually spend **walking** on one of those days?

_____hours per day

_____minutes per day

☐ Don't know/Not sure

The last question is about the time you spent **sitting** on weekdays during the **last 7 days**. Include time spent 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.

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

_____hours per day

_____minutes per day

☐ Don't know/Not sure

This is the end of the questionnaire, thank you for participating.

Health Literacy and Intellectual Disability

The center of Disease Control and Prevention (CDC) updated the Health Literacy definition in August 2020: "Personal Health literacy is the degree to which individuals have the ability to find, understand, and use information and services to inform health-related decisions and actions for themselves and others" (CDC, 2020). The definition focuses not only on the comprehension of the information, but also the actual application of this information. A special target group for health literacy is people with Intellectual Disabilities (ID).

People with intellectual disabilities may be considered a vulnerable group in terms of health, health literacy, health care, and everyday life (Geukes et. al., 2019). In their study, Latteck et. al., (2020) presented the results of three different projects with respect to Health Literacy approaches for people with ID. The authors acknowledged the challenges, the heterogeneity of the participant's abilities or experiences and suggested that a qualitative research design seems to be the preferred way to survey individuals with ID. A target group-orientated concept of health literacy seemed to be effective and should be developed, with a language that is understandable. The authors suggested that further research should be conducted in order to raise further knowledge in the field.

In another study, Oosterveld-Vlug et. al., (2020) explored the behavior of people with mild intellectual disabilities, when they face a health problem and they seek help from their General Practitioner (GP). The results showed wide discrepancies in the extent to which individuals with mild intellectual disabilities were able to handle their own health and seek help from their GP.

On her review, Chinn (2017), highlighted the importance of the communicative skills of the individuals with ID, when it comes to the health literacy. She also highlighted the limited body of research and the

lack of attention that has been paid to communicative health literacy (Chinn, 2017). Vetter et. al. (2021) finally suggested that explanatory videos with regards health literacy seems to be a realistic and efficient way to educate people with ID.

Interventions

Baker et. al., (2012) implemented a 5-week intervention program that includes training modules on oral hygiene, hand washing techniques, physical activity, male/female personal hygiene, nutrition and food safety to African American Youth participants (11-14 years old, N=46). The goal was to promote healthy lifestyle and improve healthy behaviors among disadvantaged adolescents. The students were presented education materials on these five modules and there were pre- and post- intervention questionnaires before and after each module respectively. Results showed significant behavioral changes among the participants and that the students can benefit from these initiatives.

Another health promotion and obesity prevention program to African American students (11-16 years old, N=235) was implemented by Black et. al., (2012) evaluating a 12-session home/community-based health promotion program on changes in BMI status, body composition, physical activity, and diet. Results showed that overweight/obese status declined 5% among intervention adolescents and increased 11% among control adolescents. Overweight/obese youth reduced total percentage of body fat and fat mass and increased fat-free mass at delayed follow-up and increased play-equivalent physical activity at post-intervention but not at delayed follow-up. Desert or snack consumption was significantly less to the intervention adolescents at both follow-up evaluations. The authors concluded that the changes in body composition follow changes in diet and PA and may not be detected immediately after intervention.

Assessment

There is a variety of tools examining the health literacy in adolescents or adults.

REALM-Teen

The Rapid Estimate of Adolescent Literacy in Medicine (REALM-Teen) is a literacy-screening tool in health care settings, that was developed by Davis et al., (2006). During the development and the validation of the questionnaire, 1,533 individuals (10-19 years old) participated in face-to-face interviews. Results showed sufficient evidence of criterion validity (strong correlation with other tools) and internal consistency of the REALM-Teen. The researchers suggested that the REALM-Teen may be utilized for assessing adolescent literacy skills and reading below grade level.

REALM-TeenS

The same research team (Davis et al, 2006) conducted further item response theory analysis (Manganello et al., 2017). The scope of their study was to develop a brief adolescent health literacy assessment tool: the Rapid Estimate of Adolescent Literacy in Medicine Short Form (REALM-TeenS). The results showed high correlation with the original form, and more than 80% decision consistency across both forms. They also found that the brief version requires approximately 20 seconds for administration. They suggested that the tool can be used in a variety of settings, but the reading level must be ensured by age and grade.

Health Literacy Assessment Scale for Adolescents - HAS-A

Manganello, et. al., (2015) developed a self-report health literacy scale for adolescents in order to assess four different key health literacy domains: the ability to obtain, communicate, understand, and process health information. The authors administered the questionnaire to 272 youth participants (12-19 years old) and the results showed that when it comes to self-report items, future researches may use a 5-item communication scale, a 4-item confusion scale, and a 6-item functional health literacy scale. The participants also replied to the Rapid Estimate of Adolescent Literacy in Medicine-Teen, Newest Vital Sign for validation purposes.

Health Literacy Questionnaire (HLQ)

The Health Literacy Questionnaire was developed by Osborne et. al., (2013), using perspectives from the general population, patients, practitioners and policymakers. The purpose of this tool was the assessment of health literacy needs among different populations and organizations. Factor analysis showed a 9-factor

solution. These factors described nine different domains of health literacy, based on the person's cognitive, psychological and social abilities and needs. These factors were as follows:

1. Feeling understood and supported by healthcare providers.
2. Having sufficient information to manage my health.
3. Actively managing my health.
4. Social support for health.
5. Appraisal of health information.
6. Ability to actively engage with healthcare providers.
7. Navigating the healthcare system.
8. Ability to find good health information.
9. Understanding health information well enough to know what to do.\

The researchers suggested that the tool is valid and may be useful to be utilized to surveys, evaluation following respective interventions, and studies of individual needs and capabilities.

Short Assessment of Health Literacy

Another quick tool for health literacy assessment is the Short Assessment of Health Literacy (English and Spanish version) (Lee et. al., 2010). The questionnaire includes 18 health-related terms and for each term two association words are provided. The one of the 2 words serves as a distractor and the other one is a word with a related meaning to the term. The participants are instructed to choose the most appropriate association word. It is a time-efficient and validated questionnaire.

Conclusion:

To the best of our knowledge, the above-mentioned tools have not been validated to different populations and more specifically to adolescents, youth or adults with intellectual disabilities. Taking into account the complex nature of this project, the population and the various variables that are to be examined, it is important to utilize feasible, time-efficient and user-friendly tools. Hence, it was decided to use the REALM-TeenS, for which we have the authorization from the developers. The review of literature on the respective field highlighted the need for adaptation during the administration of tools to participants with intellectual disability and the importance of the qualitative aspects in this population. That said, REALM-TeenS will be administered to the participants and will be adapted to the Greek (and every) language accordingly. The translation will be carried by all partners involved and they will have our support on this process.

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Healthy diet and Intellectual disability

According to the World Health Organization (2000), the optimal diet to maintain the overall quality of health should be consisted by a combination of four main food category supplies: four parts of starchy food (e.g., breads, cereals, potatoes), two parts of dairy food, two parts of proteins foods (meat, fish, eggs, poultry, pulses, and nuts) and four parts of fruits and vegetables. The nutrition status of individuals with intellectual disabilities (ID) has been studied by several researchers (Bertoli et al., 2006; Hoey et al., 2017; Draheim, Stanish, Williams, & McCubbin, 2007). The results of studies underlined the increased of intake of fats, sugars, and junk food. On the contrary the consumption of fruits, vegetables, fibre and dairy meals was significantly lower (Cartwright, Reid, Hammersley, Blackburn, & Glover, 2015; Gast, de Wit, van Hoof, de Vries, van Hemert, Didden, & Giltay, 2022). Inadequate nutritional choices have been associated with higher prevalence of health risks such as obesity, cardiovascular disease and type 2 diabetes (Trollor, Srasuebkul, Xu, & Howlett, 2017).

People with ID are more likely to be overweight or obese than the general population in all age categories, with prevalence rates ranging from 21% to 35% (Balogh, Lake, Lin, Wilton, & Lunsky, 2015; Rimmer, Yamaki, Lowry, Wang, & Vogel, 2010). The biological determinants (Bertapelli et al. 2016) and health-related behaviors such as poor nutrition, unhealthy eating habits, extremely high levels of physical inactivity, and overfeeding by caregivers or support staff to avoid boredom or conflict are all potential

contributing factors (Emerson, 2003; Rimmer and Yamaki, 2006; McGuire et al., 2007; Matthews et al., 2011).

Despite the risk dietary profile, the individuals with ID seldom engage in programs aimed at promoting a healthy lifestyle (Dixon-Ibarra, Lee, & Dugala, 2013; van Schijndel, Speet, Evenhuis, van Wijck, van Empelen, & Echteld, 2014). Several personal, environmental and resource-related barriers seem to play a significant role (Kuijken, Naaldenberg, van der Nijhuis-Sanden, de Valk Schrojenstein-Lantman. 2016; Salomon, Whittlea , Bellamya, Evansa, Teasdalec, Samarase, Wardd, Hsuh & Trollo, 2018). In order to support effective nutritional interventions, there is a need to explore the perspective of individuals with ID regarding to barriers and facilitators of nutritional habits, as well as to evaluate their nutrition knowledge (llingworth, Moore, & McGillivray, 2003). It is essential that intervention programs take a holistic approach, addressing attitudes and experiences as well as knowledge (Salomon, Bellamy, Evans, Reid, Hsu, Teasdale, & Trollor, 2023)

Assessment

Food Choice Questionnaire (modified Dietary Quality Tool)

The Dietary Quality Tool (DQT) is a valid tool used to assess an individual's overall dietary quality (O'Reilly & McCann 2012). It contains 13 questions addressing the current diet and the frequency of consumption of several selected foods. Each question contained a 4-point Likert scale (no, yes, sometimes, yes, often, yes, daily, with a score of 0-3). The scale is rated on a 39-point format, with higher scores indicating a more varied, balanced and healthy diet.

Zwack, McDonald, Tursunalieva, Lambert, and Lambert (2022) modified the tool in order to make it accessible to people with ID. The DQT includes questions in English with accompanying images and replaces multiple-choice answers with Likert scales to improve clinical utility in the adult population with intellectual disabilities.

Nutrition and Activity Knowledge Scale

The Nutrition and Activity Knowledge Scale (NAKS)(llingworth, Moore & McGillivray, 2003; Marks, Sisirak, Magallanes, Krok, & Donohue-Chase, 2019)) is a valid and easy-to-administer instrument used to assess nutrition and physical activity knowledge in people with ID. The scale was "*designed to assess the level of knowledge that people with an intellectual disability have about nutrition: Nutrients and foods groups; fat, sugar and caloric content of foods; weight and weight loss and the impact and benefits of activity and exercise on health*" (p. 160).

It assesses their understanding of various aspects, including nutrients, food groups, fat, sugar, caloric content, weight, weight loss, and the health benefits of physical activity and exercise. The scale consists of 35 multiple-choice questions, (21 items assess the knowledge of food, 14 items assess the benefits of exercise) which are divided into the following three themes: (1)'Nutrition', (2) Healthiest choice' and (3) 'Energy'. The scale was scored out of 16 points, with a higher score indicating increased knowledge about nutrition and physical activity. Each question is presented on a separate page, and the multiple-choice options are accompanied by colored 'Clip Art' cartoon-style pictures (Corel Corporation 1999).

Majority of the questions (72%; n = 25) provide four alternative answers (illustrations) related to nutrition or physical activity. Twenty percent of the questions (n = 7) offer three alternatives and assess the nutritional value of different meals, such as potato chips, coke, and a hot-dog, compared to a salad sandwich, orange, and juice, or a hamburger, potato chips, and an ice cream. The remaining 8% (n = 3) of the questions, related to serving size, offer two response options: a small or large serving.

To prevent potential confusion, similar topics are covered in multiple questions, reducing the influence of general intelligence or familiarity with the options provided. Furthermore, the correct response illustration is positioned differently on each page to avoid response biases resulting from consistently pointing to the same location.

Each correct response in the questionnaire is awarded one point, while incorrect responses or unanswered questions are considered as incorrect answers. Higher scores on the scale indicate a higher level of knowledge regarding nutrition and the connections between activity, energy, weight, and food needs. The scoring range for these 35 items ranges from 0 to 35.

A previously summarized NAKS version showed acceptable construct validity (Maïano et al. 2010) and reliability evidence (Sisirak et al. 2005).

Self-report form

Each participant with ID will complete a self-report form to document their daily average exercise duration, weekly frequency of physical activity, and daily average water consumption. Additionally, their food intake will be assessed by indicating whether they consumed fruits or vegetables on daily basis by checking the corresponding box. For the purposes of the study will be used the "Weekly Exercise, Nutrition and Hydration Tracking" of the Fit 5 Guide of Special Olympics.

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Health inclusion program – Theories and strategies

Contact theory

Contact theory is a social psychological theory that suggests that intergroup contact between members of different groups can reduce prejudice and improve intergroup relations, under certain conditions. Allport (1954, cit in Zuma 2014) defined prejudice as an "antipathy based upon faulty and inflexible generalization" and identified several key elements of prejudice, including cognitive biases, emotional reactions, and behavioral tendencies.

Allport also introduced the concept of the "contact hypothesis," which suggested that intergroup contact could reduce prejudice under certain conditions. According to Allport, positive intergroup contact could lead to increased understanding and empathy between groups, as well as decreased prejudice and discrimination. The original formulation of Contact Theory explicitly states that the goal of interracial/interethnic contact is "to reduce intergroup prejudice". Contact Theory acknowledges that there are other factors that contribute to intergroup relations, but it prioritizes prejudice reduction as the key factor to improving those relations (Zuma, 2014).

The basic concepts of Contact theory

The basic idea behind contact theory is that when members of different groups interact with each other in a positive and cooperative way, they can develop more positive attitudes and reduce prejudice towards each other. The theory proposes that the success of intergroup contact in improving relations between groups depends on several key factors:

- Equal status: The contact between groups should occur under conditions of equal status.
- Common goals: The contact should involve cooperation towards common goals that benefit both groups.
- Intergroup cooperation: The contact should involve opportunities for intergroup cooperation and collaboration.
- Support of authorities and institutions: The contact should be supported by authorities and institutions that have influence over the groups involved.
- Personal interactions: The contact should involve personal interactions between members of the groups, rather than just exposure to media or other impersonal forms of contact.

Contact theory suggests that when these conditions are met, intergroup contact can lead to improved relations between groups and reduced prejudice. However, it is important to note that contact alone is not enough to eliminate prejudice, and that other factors can also play a role in shaping intergroup relations (Pettigrew, Tropp, Wagner, Christ, 2011).

How can contact theory be applied in an inclusive healthy lifestyle program

Contact Theory has been applied in a variety of contexts, including schools, workplaces, and community settings, to promote intergroup understanding and reduce prejudice and discrimination. Contact theory can be a useful tool in promoting inclusion and reducing prejudice in health programs. For example, contact theory could:

1. Encourage interactions between different groups: Health programs can provide opportunities for members of different groups to interact with each other.
2. Promote common goals: Health programs can promote common goals that benefit all participants. For example, a program could focus on improving the health and well-being of all participants, regardless of their differences.

3. Promote intergroup cooperation: Health programs can encourage intergroup cooperation by creating opportunities for participants to work together towards common goals. For example, a program could involve participants in group exercise classes or team-based challenges.
4. Promote personal interactions: Health programs can promote personal interactions between members of different groups by providing opportunities for participants to share their experiences and learn from each other.

Planned behavior theory

Various theories have been proposed to explain human behavior. One of these theories is the theory of planned behavior (TPB). It was first introduced by Icek Ajzen in 1985 and aims to explain how attitudes, beliefs and perceptions influence an individual's behavior (Ajzen, 1991).

This theory states that individual's behavior is influenced by their attitudes towards the behavior, subjective norms, and perceived behavior control. The first factor is attitude towards the behavior, which measures an individual's positive or negative evaluation of the behavior. The second factor is subjective norm, which refers to the perceived social pressure to perform or not perform the behavior. The third factor is perceived behavioral control, which reflects the individual's experience and anticipated difficulties or obstacles in performing the behavior.

If you can measure these three variables, you can predict a variety of behaviors. For example, a meta-analysis of 111 studies showed that the TPB explained 27% of the variance in health behaviors, making it a useful model for designing interventions to promote healthy behavior (McEachan et al., 2011).

How can Planned behavior theory be applied in an inclusive healthy lifestyle program

Planned behavior theory can help to promote healthy behaviors among students by addressing the variables that influence behavior. By focusing on attitude, subjective norm, and perceived behavioral control, schools can create a culture of health that supports the well-being of all students. This can be achieved by providing information and education about the benefits of healthy behaviors such as regular exercise, healthy eating, and good sleep habits. To promote healthy behavior, it is important to create a culture of health within the school community. We can involve teachers, parents, and other stakeholders in the health program, and to provide opportunities for students to engage in healthy activities together.

Self-efficacy

Since the publication of Bandura' s 1977 Psychological Review article, "self-efficacy" has become one of the most frequent terms in the social, clinical, and counseling psychology literature. The self-efficacy theory, developed by Bandura, suggests that personal mastery or efficacy is the key to behavioral and psychological change. Self-efficacy expectancy, a person's belief in their capability to perform a behavior, has a powerful influence on the initiation and persistence of that behavior, and is the best predictor of behavioral initiation and persistence. Outcome expectancy, the belief that a given behavior will lead to a specific outcome, is also related to mastery or coping (Maddux & Stanley, 1986).

How can Self-efficacy theory be applied in an inclusive healthy lifestyle program:

Here are some ways in which self-efficacy theory can be applied in an inclusive health program in schools, in order to promote positive health behaviors and improve health outcomes for all students (Bandura, 1997):

1. Providing positive feedback: Providing positive feedback can enhance students' self-efficacy beliefs. Positive feedback can motivate students to continue engaging in healthy behaviors and build their confidence.
2. Encouraging social support: Social support can play an essential role in enhancing self-efficacy beliefs. For example, schools can establish peer mentoring programs, where older students provide support and guidance to younger students regarding healthy behaviors.
3. Modeling healthy behaviors: Observing others performing healthy behaviors can increase students' self-efficacy beliefs. Teachers and school staff can model healthy behaviors, such as eating nutritious

foods, engaging in regular physical activity, and getting enough sleep. Modeling healthy behaviors can show students how to engage in healthy behaviors and build their confidence (Bandura, 1997).

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State-Trait anxiety Inventory (STAI)

Special needs individuals frequently experience elevated levels of anxiety. Anxiety manifests as an excessive concern that interferes with many areas in life and is sometimes hard to manage. This state is often accompanied by restlessness and heightened nervous system activity. Also, this state has negative effects on the abilities, performance and routine activities in people with special needs (Carraro & Gobbi, 2012) By studying anxiety in people with special needs, we can have a better understanding on how common it is, how it affects their daily life activities and how to create adequate interventions.

Cattel (1966, cit. in Gros, Antony, Simms, McCabe, 2007) was the first one to make a distinction between anxiety as a state and anxiety as a trait. Further it was developed by Spielberg (1966, cit. In Gros et al., 2007). Anxiety as a trait refers to a stable variable, less flexible, that is frequently experienced as a state anxiety. On the other hand, anxiety as a state varies in intensity and fluctuates over time. One is a personality trait, the other one is a psychological state. Therefore state anxiety is a transitory emotional state. The initial difference between state-trait anxiety was supported by introspective reports, but it has been consistently supported through psychometric evaluations in the literature.

Spielberger's model of state and trait anxiety (1966, 1972, cit. in Gros et al., 2007) suggests that anxiety arises from internal and external stimuli, cognitive factors, and defence mechanisms. Therefore an anxious state can be triggered by external causes, further if the stimuli are considered threatening, cognitive and behavioural defence mechanisms are activated. Trait anxiety is considered a reflection of past experiences of state anxiety, increasing an individual's proneness or sensitivity to future experiences of state anxiety.

Anxiety has been intensively studied since Freud, therefore significant efforts have been made to define and measure anxiety. After the distinction made by Cattel and developed by Spielberg, the later elaborated an widely used scale: Spielberg's State-Trait Anxiety Inventory (STAI). STAI measurement is based on

the distinction between the relatively stable trait and the more fluctuating state component of anxiety (Tenenbaum, Frust, Weingarten, 1985). High scores on STAI scale can indicate that a person is more inclined to experience anxiety and is more likely to develop anxiety disorders (Chambers, Power and Durham, 2004, cit. in Zsido, Teleki, Csokasi, Rozsa & Bandi, 2020). STAI is considered a reliable tool in different sets of population. However, the main problem with this scale is that it consists of 40 items, 20 items that measure the state anxiety and 20 items that measure the trait anxiety (Marteau, Bekker, 1992). Certain populations may struggle with lengthy scales, such as individuals with special needs. As the scale will be administered to individuals with special needs, it is important to create the most suitable conditions for scale administration. To address this problem, we chose a short version of this scale, consisting of 10 items, 5 items for each state. The short version of STAI was analysed in a research in 2020 (Zsido et al.), which demonstrated good reliability and internal consistency parameters. Therefore, it is a good alternative for the longer version. The research conducted by the authors presented a short version of the scale that demonstrated good validity. The scale's effectiveness in capturing relevant aspects and providing accurate results, therefore it can be used in various future researches.

In order to make the STAI scale for the state and trait anxiety easy to apply and as accessible as possible for individuals with special needs, we have added to the likert scale in addition to the written answers (not at all, somewhat, moderately so and very much so) representative emoticons for each answer.

STAIS-5 (Zsido et al., 202)

A number of statements which people have used to describe themselves are given below.

Read each statement and then circle the number at the end of the statement that indicates

HOW YOU FEEL RIGHT NOW, that is, at this moment. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe your present feelings best. Thank you.

		1- Not at all	2- Somewhat	3- Moderately so	4- Very much so
1	I feel upset.	⬭	⬭	⬭	⬭
2	I feel frightened.	⬭	⬭	⬭	⬭
3	I feel nervous.	⬭	⬭	⬭	⬭
4	I am jittery.	⬭	⬭	⬭	⬭
5	I feel confused.	⬭	⬭	⬭	⬭

STAIT-5 (Zsido et al., 202)

A number of statements which people have used to describe themselves are given below.

Read each statement and then circle the number at the end of the statement that indicates

HOW YOU GENERALLY FEEL. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe how you generally feel. Thank you.

		1- Not at all	2- Somewhat	3- Moderately so	4- Very much so
1	I feel that difficulties are piling up so that I cannot overcome them.			●	
2	I worry too much over something that really doesn't matter.				
3	Some unimportant thoughts run through my mind and bothers me.				
4	I take disappointments so keenly that I can't put them out of my mind.			●	
5	I get in a state of tension or turmoil as I think over my recent concerns and interests.				

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