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A Global Matrix of Para Report Cards of physical activity of children and adolescents with disabilities

Abstract

This is an overview of the results from 15 countries in a Global Matrix of physical activity (PA) Para Report Card grades, specific to children and adolescents with disabilities (CAWD). The methodology was based on the Active Healthy Kids Global Alliance's Global Matrix 4.0. Data were aligned to 10 indicators (Overall PA, Organised Sport, Active Play, Active Transport, Physical Fitness, Sedentary Behaviours, Family & Peers, Schools, Community & Environment, and Government) to produce Para Report Cards. Of the possible 149 grades, 45% were incomplete, particularly in Active Play, Physical Fitness, and Family & Peers. After aggregating data, Overall PA was graded the lowest (F), Government and Schools the highest (C). Disability specific surveillance and research gaps in PA were apparent from 15 countries and regions around the world. More coverage of data in Para Report Cards is needed to serve as an advocacy tool to promote PA among CAWD.

Keywords

youth; special education; policy; health promotion; advocacy; data harmonisation

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Introduction

The global pandemic of physical inactivity requires comprehensive and coordinated efforts at the individual, community and governance levels (Pratt et al., 2020; Rutter et al., 2019). Some potential benefits of physical activity (PA) among children and adolescents with disabilities (CAWD)¹ includes improvements in confidence, concentration, muscle strength, motor skills, balance, and coordination (Smith et al., 2022). The longer-term benefits include habit forming during adolescence that could carry forward into adulthood (Hayes et al., 2019; Telama et al., 2014), even for adolescents with disabilities (Stewart et al., 2013). Furthermore, increased PA are associated with reduced risks of non-communicable diseases, such as diabetes, coronary heart diseases, stroke, certain cancers as well as improved mental health outcomes (WHO, 2020). Evidence of these benefits is not new, as the physical inactivity pandemic was first reported over a decade ago in the Lancet's first series on PA (Kohl et al., 2012), yet according to recent global surveillance studies, 81% of adolescents aged 11-17 years old were insufficiently physically active (Guthold et al., 2020). To note, very few studies included in global surveillance have disaggregated data by disability status of individuals, leaving a large knowledge gap when it comes to the PA behaviours of CAWD (Martin Ginis, van der Ploeg, et al., 2021).

International comparison studies require a certain degree of data harmonisation to make results comparable between countries (Fortier et al., 2017). One such approach in relation to PA is the Global Matrix of PA Report Cards, led by the non-profit organisation Active Healthy Kids Global Alliance (AHKGA). The Global Matrix first edition was in 2014, where 15 countries and regions reproduced the Canadian PA Report Card (Colley et al., 2012). This grew to 38 countries and

¹ The definitions of children and adolescents can be found from the adolescent health literature (see Sawyer et al, 2019). The term CAWD is used consistently in this special issue to refer to data that is specific to CAWD or chronic conditions, and it is not intended to place a label on these individuals with disabilities.

regions in 2016 (Tremblay et al., 2016), 49 in 2018 (Aubert et al., 2018), and most recently 57 in 2022 (Aubert, Barnes, et al., Review). The aims of the PA report cards are to synthesise existing knowledge on PA indicators and translate it into grades through a process that engages practitioners, researchers and policy makers. The Report Cards can be used to motivate and advocate for appropriate actions that address global levels of physical inactivity (Tremblay, Barnes, et al., 2014). Until now, only Finland (Tammelin et al., 2018), Hong Kong (Sit et al., 2020), and the Netherlands (Burghard et al., 2018) have developed specific Report Cards using disability specific data. This could be due to the lack of available disability specific data (Martin Ginis, van der Ploeg, et al., 2021) or a lack of coordination to report such data as grades.

Various global organisations have started to recognise the importance of PA among CAWD. Perhaps, most notably, the latest WHO PA guidelines were published in 2020 and included, for the first time, people with disabilities (Carty, van der Ploeg, et al., 2021). Another example is the special session on PA at the UN Human Rights Council (HRC 46) on the 5th of March 2021. and Moreover, side event sessions at the 13th and 14th Convention on the State Parties to the Convention on the Rights of Persons with Disabilities (UN, 2006) accepted the side event sessions coordinated by the International Federation of Adapted Physical Activity (IFAPA) to raise awareness of disability specific PA programs globally (IFAPA, 2020, 2021). Most recently, a disability movement started in 2021 that combined international sport organisations, such as the International Paralympic Committee, Special Olympics International, and Invictus Games Foundation, alongside the International Disability Alliance and other organisations to create the #WeThe15 human rights campaign (Carty, Mont, et al., 2021).

In our effort to present an overview of PA of CAWD, this special issue in *Adapted Physical Activity Quarterly (APAQ)* introduces the Global Matrix of Para Report cards on PA of children and adolescents with disabilities or chronic conditions (hereinafter referred to as Global Matrix Para Report Cards). Brief Para Report Cards from the latest and best data in 12 countries or regions are included in this special issue. The purpose of this paper was to summarise the

international findings of disability data in Para Report Cards from a global perspective through the adoption of the same methodology that has been used to create the Global Matrix 4.0.

Methods

Recruitment of countries

This special issue was created following conversations with the AHKGA Executive and the lead author during the recruitment of the Global Matrix 4.0 in the spring of 2019. Communications were sent out to contacts of 49 member countries or regions involved in the Global Matrix 3.0 and its new members (e.g., Israel and Philippines), about collating disability specific data to form disability specific report cards. After approval from the APAQ editorial board, a call for international collaboration was made in the autumn 2021 through AHKGA, a call for papers through the APAQ website, and the IFAPA communication channels. A recruitment target of at least one country in each of the seven IFAPA regions was set to gain global coverage.

Adaptations to the Active Healthy Kids Global Alliance grading methodology

In a parallel process to Global Matrix 4.0, the grading process remained the same for each indicator as in other Report Cards (see benchmarks and grades in Supplementary Table 1). The terminology of the benchmarks remained almost the same from those included in the Global Matrix 4.0 with exception that there was the explicit request for data on CAWD. A small team of researchers discussed the benchmarks after adapting them for the Para Report Cards and identified two additional benchmarks that would be relevant disability specific benchmarks.

The first benchmark addition was within the Physical Fitness indicator. In the Global Matrix 4.0, the Physical Fitness benchmarks were based on the percentage of children and adolescents who met the criteria from the Eurofit battery as specified by Tomkinson and colleagues (2018). There are other adapted physical fitness tests, such as the Brockport test, that may have been used

instead. Furthermore, Tomkinson norms are not suitable for CAWD (Király et al., 2019). As such, the benchmark was designed to encourage reports of adapted physical fitness tests. To address this, a note was placed in the benchmarking tool, “Note: Where normative values have not been published for a specific impairment/disability group, outline what has been modified and which tests were used (i.e. Brockport, etc)”.

Another benchmark was created for the Community and Environment indicator. This indicator was considered to fit under the environment factors domain of the International Classification of Functioning, Disability and Health (Hutzler, Barak, Arbour-Nicitopoulos, et al., Review; WHO, 2001). It was important to add an extra benchmark on “% children and adolescents with disabilities who have access to adapted physical activity or sport equipment” as lack of appropriate facilities were commonly cited barriers to participation in PA among CAWD (Shields & Synnot, 2016).

It was also recognised that some data on disabilities may be fragmented because of context, representativeness, and access (Cappa et al., 2015). For comparison purposes between countries and regions, disabilities were defined as per the UN definition for “persons with disabilities [to] include those who have long-term physical, mental, intellectual or sensory impairments which in interaction with various barriers may hinder their full and effective participation in society” (UN, 2006). Details of each country and region data source can be found in Supplementary Table 2.



Consultation with stakeholders

Each team was asked to contact stakeholders to confirm that the results they found were a reflection of what was considered appropriate in their country or region. The stakeholders could comment on the grades and it may have led to further basis for the grades per indicator. This co-production aspect encouraged debate between practice, research and policy, and in most cases

explored the strengths, weaknesses, opportunities and threats of the Para Report Cards (Hutzler, Barak, Arbour-Nicitopoulos, et al., Review). Country or region specific details can be found from the respective brief Para Report Cards.



Review of the national Para report card grades

Following the synthesis of the best data sources in each country and region, translation of data into grades, as outlined in the Global Matrix 4.0 procedures (Aubert, Barnes, et al., Review), as well as consultation with stakeholders, each research team was asked to submit their grades for an external audit. The audit submission included the proposed grade for each indicator, the evidence for their decision, and the rationale for the grade. This rationale could also include notes from the stakeholder meetings with respect to the grades. The external auditors included experts familiar with the Global Matrix 4.0 procedures. Independent auditors gave feedback on the grades by approving or requesting further transparency of evidence and rationale, and in the rare case to reconsider the grade. The authors had the opportunity to improve their audit submission prior to the approval by the auditors. Each audit file can be made available on request to the corresponding author.

The production of overall (global) grades for the purposes of this Global Matrix on Para Report Cards was carried out using Aubert and colleagues (2018) scoring guidelines, wherein each grade was converted to a numeric scale, where a grade F = 2, D- = 4, and subsequent increments of 1 from D=5 through to A+ to 15 (Aubert et al., 2018). For each indicator where over half the countries and regions had provided grades from F upwards, the scores were averaged by mean score, and rounded down to produce a global grade. Grades with INC were not included in the calculation. Overall grade assignment for each country were also calculated in a similar way, provided there was at least one grade for at least one behavioural indicator (Overall PA, Organised Sport and Physical Activity, Active Play, Active Travel, Sedentary Behaviour, and



Physical Fitness) and one influencer indicator (Family & Peers, Schools, Community & Environment, and Government Strategies & Investments).

Results

There were 15 countries or regions from six of the seven IFAPA regions in this Global Matrix of Para Report Cards. The European region had with six countries involved, Asia with three countries or regions, North and South America with two countries each, and Oceania and Middle East with one country each (Supplementary Figure 1).

Government policy reports were used in 12 countries in six IFAPA regions, disability research studies from 11 and disability data were disaggregated from national studies on PA in nine countries and regions (Supplement Table 2). Disaggregated variables included non-categorical approaches that were broad in nature, such as, “do you have a long-term illness, disability or medication condition (like diabetes, arthritis, allergy, or cerebral palsy) that has been diagnosed by a doctor?” in the Health Behaviour in School-aged Children studies (Ng et al., 2017), functional difficulties batteries that align with the Washington Group on Disabilities (Ng et al., 2020), as well as specific learning exceptionalities (Ng, Pickett, et al., 2018). Other sources of data included special education reports (n = 5; e.g., the European Agency for Special Needs; REF- Ramberg et al, 2020) disability PA studies (n = 4; e.g.the Canadian PA measurement study; REF-Moore et al, 2022)and general education reports (n = 2).

Collectively, the overall Para Report Card grade was D for all countries and regions across the 10 indicators (Table 1). Finland had the highest overall grade (C+) and several countries had the lowest grade of D- (Poland, Spain, United States) (see Supplement Table 3 for Global Matrix by country view). Of the possible 149 grades across the indicators, there were 83 grades (56%). Israel assigned grades for nine of the 10 indicators and had an overall grade of D+. The Philippines could only assign two indicators and also had an overall grade of D+. Hong Kong (D)

did not include a search for data on the physical fitness indicator. Canada (D), New Zealand (D+), South Korea (D+), and Spain (D-) collected additional information on other indicators such as sleep. The average number of indicators was five per country or region, although there was much variation (Figure 1).

There was high variation in the submitted grades across the indicators. The most common indicators to be reported on was the Government Strategies & Investments in 13 Para Report Cards, Overall PA, Organised Sport, and, each with grades from 12 Para Report Cards. There were 10 countries or regions that included a grade for the Sedentary Behaviours and the Schools indicators, and eight included a grade for Active Transport or Community & Environment. From the 15 Para Report Cards, there were more inconclusive (INC) grades than actual grades for Physical Fitness (n = 14), Active Play (n = 11), and Family & Peers (n = 9) indicators.

Discussion

Physical Activity Para Report Card Grades

This is the first-time disability specific data from around the world have been aligned against standardised benchmarks based on the AHKGA Global Matrix methodology to produce Para Report Cards on PA. Although no country or region produced grades for every indicator, this exercise has been useful to identify specific research and policy gaps on PA disability data. Collectively, the overall Para Report Card grade of D was low, although there are variations across the countries and regions in terms of data provision, PA behaviours and influencers of PA.

Overall Physical Activity

Twelve countries and regions had data against the benchmark for Overall PA, with an average grade of F. The highest grades from any Para Report Card was grade C (47% - 53%) in New Zealand and D (i.e., 27%-33% participate in daily moderate to vigorous PA) in Canada, Israel,

and South Korea. Chile, Finland, Poland, and Spain reported a grade of D- whereas France, Hong Kong, Ireland and United States reported F for the same benchmark. There were incomplete data from the Philippines, Lithuania and Brazil.

In each country, included data sources for Overall PA were from self- or proxy-report surveys. In terms of device-based measures, there were data sources from Canada (Arbour-Nicitopoulos et al., Review) and Hong Kong (Sit et al., 2020). and Canada (Arbour-Nicitopoulos et al., Review) There is currently a lack of validity of accelerometer measurements among individuals with mobility impairments (Arbour-Nicitopoulos et al., Review), as reported elsewhere (Forseth et al., 2022).

Data from Israel were a combination of self-report from general schools (8%-12%), and teacher report (40%-46%) from special schools (Hutzler, Barak, Tesler, et al., Review). The South Korean data were from a multitude of surveys and the grade was based on a lenient criteria of four days a week (Lee et al., Review), like the Chilean grades and New Zealand. There has been a shift in the PA guidelines, where the Global Matrix 3.0 benchmarks were based on 60 minutes of MVPA daily (WHO, 2010), to these Para Report Cards and Global Matrix 4.0 to a benchmark to reflect the updated guidelines of an average of 60 minutes of MVPA per day (Bull et al., 2020). Such a shift has made benchmarking this indicator challenging. Only New Zealand reported a grade on the updated PA guidelines by calculating 420 minutes of PA in a week and reported a grade C.

The other benchmark for this indicator was the percentage of CAWD who completed the daily recommended amounts of MVPA four times a week, if an average cannot be reported. This was only provided by Finland in their brief report (Asunta et al., Review) where a grade of C was reported although in this paper, their data would support a grade F for daily MVPA. The challenge for some countries and regions to accurately report the benchmark could have been due to the wider timescale to collect data, and that data were likely to be based on measures of the old WHO guidelines rather than the new ones.

For the first time, the updated PA guidelines were inclusive of persons with disabilities (Bull et al., 2020), although evidence was downgraded due to indirectness (Carty, van der Ploeg, et al., 2021). In other words, the inclusion of persons with disabilities into the guidelines was based on the evidence that PA health outcomes were not sufficiently different between children and adolescents without disabilities. This has been criticised due to the risk of publishing guidelines where research was scarce or lacking direct evidence among persons with disabilities.

Furthermore, the ableistic guidelines were not seen to properly incorporate inclusive policies whereby guidelines could be attained (Martin Ginis, Latimer-Cheung, et al., 2021). Such involvement needs to be considered when promoting PA among CAWD. For example, the UK Chief Medical Officers PA guidelines for CAWD were based on disability specific data, and infographics co-created with CAWD. The findings of such work led to recommendations of 120-180 minutes of MVPA per week, that could be carried out for 20 minutes daily or three times for 40 minutes per week (Smith et al., 2022). The updated findings from Smith and colleagues (2022) are significantly different from the WHO guidelines for children and adolescents and can make future meaningful comparison work between children and adolescents with and without disabilities challenging. New ways to collect data that could shed light on the performance against these recommendations are needed. Furthermore, work may need to examine how these recommendations are comparable with the existing Global Matrix benchmarks for the Overall PA indicator.

Organised Sport and Physical Activity

Data on Organised Sport and PA participation was provided by 12 countries, with an average grade D. Canada (C+) had the highest grade, albeit raised concerns with how sport program participation within the available national data and the Para Report Card benchmark disregards program type, frequency and the quality of participation (Evans et al., 2018). Of the two indicators that the Philippines was able to provide, they gave a grade of F due to the elite sport approach

through the Asian Youth Para Games or low provision at school-based activities. In France, despite several initiatives implemented to promote access to sport for CAWD, it was estimated that only 3% had a membership to a sport club with adapted sport opportunities (Aubert, Verdot, et al., Review). This may temporarily increase in the build up to the Paris 2024 Paralympic Games because Paralympics have been known to provide more visibility to role models of CAWD (Coates & Vickerman, 2016). It is also important to note that successful legacy programmes may take a decade to show increases in participation among CAWD (Dickson et al., 2020).

Participants in organised sports are twice as likely to participate in daily MVPA (Ng et al., 2016), yet in the Para Report Cards, few CAWD (0.2% - 17%) in Brazil, Israel, Lithuania or Poland were involved School Paralympic programmes or community organised sports (Augustos et al., Review; Hutzler, Barak, Tesler, et al., Review; Pozeriene et al., Review). The range of organised sport participation in the United States (Grade = D+) and Ireland (Grade = D) was between 19% to 56%, depending on types of impairments, education level, gender, or frequency of participation (Ng et al., Review; Stanish et al., Review). The data were more consistent in South Korea (Grade = D-), with 20-24% of CAWD participating in organised sport or physical activity. The grade was INC from Hong Kong despite a few available studies with data on organised sport, the results did not match with the benchmark (Sit et al., 2020).

These low rates of participation in organised sport and PA require specialised training of coaches, mainly volunteers, to improve their self-efficacy to deliver effective organised sports (Townsend & Peacham, 2021), financial support to make participation possible with appropriate adapted equipment (Wright et al., 2019) and placing an emphasis on fun (Smith et al., 2022). Furthermore, organised sports and PA organisations would work more with peer support or professionals, like occupational therapists, who play an important role to facilitate the uptake of organised sport (Lorenzo et al., 2022).

Active Play

Only three countries had data on this indicator based on two benchmarks, as such, the overall grade was INC. The other 12 countries or regions reported INC for this indicator. There were two data sources in Finland from national surveys with data disaggregated by disabilities, whereby 29% to 34% of CAWD took part in unstructured PA at least four times a week (Asunta et al., Review). Data from special education teachers in Israel reported a mean grade of D+ for unstructured active play for more than two hours per day (Hutzler, Barak, Tesler, et al., Review). Data in Canada were limited to outdoor play only and approximately 7% of CAWD aged between 12-17 years spent two or more hours playing outside (Arbour-Nicitopoulos et al., Review).

There may be environmental conditions (e.g., weather or safety parameters) that limit CAWD opportunities to play in outdoor spaces, where children and adolescents without disabilities commonly accumulate time spent in unstructured forms of PA (e.g., playgrounds, parks, beaches). Active play includes both indoor and outdoor forms of activities and is often regarded as an occupation of children in and of itself allowing self-development (Lynch & Moore, 2016). Some good inclusive design practices can be found from Northern Ireland, whereby accessible changing facilities were part of the design of a park with inclusive play equipment (Ng et al., Review), and in Canada with the not-for-profit Canadian Jumpstart Charities' Inclusive Play Project (Arbour-Nicitopoulos et al., Review). Yet, these infrastructural changes remain unnoticed unless there are improvements to monitor this indicator.

Active Transport

Eight countries assigned grades for Active Transport with a wide variety of grades from B (Finland) to D (Israel and New Zealand) to D- (Canada, Chile, Hong Kong, Ireland, and South Korea). Much of the data were limited to only transport to or from school and trips to other venues such as sports or outdoor play facilities were lacking. No countries provided a grade of F, hence the average grade across the countries and regions for active transport was D. In Finland's Para Report Card, between 65% to 77% of CAWD, who lived within 5km from their school,

reported using active transport (Asunta et al., Review). The reason for limiting data to within 5km was because individuals who live beyond this distance from their schools are provided free transportation. Such distances may be too far for CAWD, as a maximum distance for cycling to school for adolescents without disabilities has been reported to be around 4km (Nelson et al., 2008). Furthermore, CAWD may not have the possibility to travel to or from school without assistance, due to the impairment, the distance to school, lack of trained drivers with help individuals onto the motorised transport, as well as issues around neighbourhood safety and policies (Ross et al., 2020).

There were seven other countries with a grade of INC for active transport. Brazil reported an INC because the only data source they could find was from 15-17 year olds and felt it wasn't sufficient to convert the information of 54% of adolescents with disabilities who use active transport to school into a grade (Augustos et al., Review). There was no known data on active travel in France, Lithuania, Philippines, Poland, and Spain.

There were some concerns about how active transport was reported in the studies from eight countries. The information does not explain the environmental barriers experienced by CAWD when it comes to participation in PA. The concept of being active during transport would assume the individual's ability to be ambulant, confidence to use bicycles, or have a robust chair to wheel around for the regular commute (Ross et al., 2020). Further considerations are needed for the purpose of obtaining active transport data for CAWD as accessibility, ability, and environmental structures may prevent a highly physically active CAWD to actively commute, or, likewise, information used for intervention development to increase levels of active transport.

Sedentary Behaviours

The overall grade for the Sedentary Behaviours indicator was D- with country and region ranges between C (Israel) and F (Chile and France) across 10 countries and regions. The benchmark

was based on the Canadian Sedentary Behaviour Guidelines of two hours daily of recreational screen time limit (Tremblay et al., 2011). From self-report surveys, like the HBSC study, just over half (51%-54%) of Israeli CAWD and from the Spanish National Health Survey, 41% of Spanish CAWD watch TV up to two hours a day during their free time (Hutzler, Barak, Tesler, et al., Review; López-Gil et al., Review). The United States grade of D+ was based on the National Survey of Children's Health data (Stanish et al., Review) whereby less than 40% of CAWD use TV or computers for two hours or less. Other survey data were reported from Canada, Ireland, New Zealand and Poland with grades of D and D-. In other countries (Brazil, Finland, Lithuania, Philippines, South Korea), available data around sedentary behaviours were insufficient or not according to the benchmark.

Despite the label for indicator of 'Sedentary Behaviour', the benchmark was based on the commonly accepted proxy of screen time limits of 2 hour per day. Other types of sedentary behaviours that have been measured in international studies include the time spent playing computer games. Ng and colleagues (Ng, Augustine, et al., 2018) reported more males with disabilities spent two or more hours on computer games than other male peers without disabilities when data were pooled from 15 countries. In the same international comparison paper, the total screen time reported was between 6.0 to 6.8 hours during weekdays and 8.0 to 9.3 hours during weekend days among CAWD, yet that sum may be higher due to simultaneous screen activities. In addition to other modes of screentime, data often are not described as being sedentary or not. For example, exergaming is a mode of computer gaming whereby an individual does some physical activity, and has been used as an intervention tool to promote PA among CAWD (Lai et al., 2020). As such, messages to promote the reduction of sedentary behaviours need to be considered with people with physical impairments in mind (Smith et al., 2021). Strategies to limited recreational screen time, as recommended by the WHO (Carty, van der Ploeg, et al., 2021) need to be aware of the messages, such as 'sit less, move more' can modified into more universally accepted with messages of 'move more' (Smith et al., 2021).

Physical Fitness

Only South Korea assigned a grade for the Physical Fitness indicator in their Para Report Card. The grade of D+ was based on 38% of CAWD met over the 50th percentile of muscular strength, muscular endurance, cardiovascular fitness and flexibility. The data consisted of 3,500 CAWD involved in fitness testing, organised by the Korean Paralympic Committee, by visiting one of the 11 fitness centres around the country between 2018 and 2021 (Lee et al., Review).

Other countries and regions had limited data on physical fitness. For example, a convenience sample of children on the autism spectrum on Ireland completed the 20m sprint, standing broad jump, and sit and reach and would have been graded F (Ng et al., Review) if it were compared with the Tomkinson's norms, as specified in the Global Matrix 4.0 benchmark (Aubert, Barnes, et al., Review). Similarly, another study on adolescents with intellectual disabilities in France who completed the EUROFIT physical fitness test battery would have led to a grade F (Aubert, Verdot, et al., Review). In Lithuania, studies on the EUROFIT test battery were from 2005 and were considered to be too old for inclusion in the grading (Pozeriene et al., Review).

Adapted physical fitness exercises have been established for several decades, including the norms for specific impairment groups (e.g., Buell's norms for people with visual impairments in 1982), complete tests such as the Brockport Physical Fitness Test (Winnick, 2011), and adapted tests for national physical fitness systems (Király et al., 2019). At a national monitoring level to produce Para Report Cards, there are several challenges for fitness testing. Even in the general Global Matrix 3.0, 55% of countries and regions reported INC (Aubert et al., 2019), hence it was not surprising that only one country, South Korea, produced a Para Report Card grade.

Family and Peers

The Family & Peers indicator was one of four areas categorised as influencers to PA from the first Global Matrix (Tremblay, Gray, et al., 2014). There were five benchmarks, of which no Para

Report Card stated that there was data on all of the benchmarks. Grades for the Family & Peers indicator were assigned in only five Para Report Cards, hence did not meet the criteria for an overall grade and was inconclusive. This was not surprising as 45% of the countries or regions reported INC in Global Matrix 3 (Aubert et al., 2019).

Of the five countries and regions that produced grades for the Para Report Card, the highest was in Finland (C+), based on parental support for their children with disabilities to be physically active (Asunta et al., Review). Three disability specific benchmarks (family member participation, provide transport, peer engagement) were aggregated in Ireland to produce a grade C (Ng et al., Review). Family support and peer support in Chile differed vastly, where a higher grade would have been applied in Chile if it were only based on peer-led benchmarks. Around one in four CAWD in Israel reported participating in PA with family or peers and D- was the assigned grade for this indicator (Hutzler, Barak, Tesler, et al., Review).

No data on the Family and Peer indicator was found in Brazil, France, Lithuania, Philippines, Poland, South Korea, Spain or the United States. Some data were available from Hong Kong or Canada in relation to support by parents and friends, however the authors felt the data was insufficient or did not align to the benchmark (Arbour-Nicitopoulos et al., Review; Sit et al., Review). Specific concerns were raised within the Para Report Cards for not adequately capturing the greater, and often hidden, effort that parents of CAWD must make to support their child in PA (Goodwin & Ebert, 2018).

Schools

The Schools indicator received an overall average grade of C across nine Para Report Cards. France had the highest grade of B+, whereby, in theory, all pupils with special educational needs (SEN) attended the same amount of physical education (PE) classes as their peers without disabilities. More specifically, approximately 70% of special education and health institutions

offered PA opportunities (PE, sport and other) and that 94% of these institutions had qualified staff in PE or were APA specialists. Furthermore, due to the Equity in Rights and Opportunities Law in 2005, all schools needed to have made adequate renovation provisions to meet accessibility norms by 2015 (Aubert, Verdot, et al., Review).

In Finland, the grade assigned to the schools indicator was B, which came from four data sources, whereby 91% of the general schools, where inclusion took place, were registered in the national whole-school programme called Finnish Schools on the Move. Between 68% and 84% of CAWD reported adequate facilities to take part in PE and school sports during lesson time, recess time or have peer leaders guiding them (Asunta et al., Review), although an actual objective national database of facilities was currently lacking.

Israel and Brazil graded B- for the Schools indicator. Approximately one-third of CAWD in Brazil reported their schools offer adapted physical activities, although 59% of CAWD had access to suitable facilities (Augustos et al., Review). In Israel, the teachers acknowledged that students with SEN often acquired at least one individual physical therapy session weekly. That was, in addition to the minimum of two hours of PE a week completed by 80% to 100% of students with SEN depending on the educational setting (Hutzler, Barak, Tesler, et al., Review). Two-thirds of Irish CAWD considered sport facilities at school to be 'good', although one-third took part in two hours of PE a week (Ng et al., Review). Less than half (48%) of adolescents with physical disabilities in New Zealand reported to take part in PE (Wilson et al., Review).

Data from Lithuania were fragmented across the benchmarks from high level of participation (89%) in PE to 10% of secondary schools that were accessible for wheelchair users, hence the average grade in Lithuania was D. Similarly, in Poland, accessible facilities were lacking and thus reported an INC grade. Hong Kong, Canada, and Philippines assigned an INC due to insufficient data (Arbour-Nicitopoulos et al., Review; Sit et al., Review).

There was on average a grade of C for the school indicator from 10 Para Report Cards. No Asian country was able to give a grade to highlight differences across this Global Matrix of Para Report Cards. Although whole-school approaches to PA are recognised as effective strategies to promote PA (Milton et al., 2021), very little evidence exists on the policies and practices of such programmes for special education settings.



Harmonisation of school data was particularly challenging given the different education systems. Even for PE, approximately 72% of CAWD globally have access to PE (Hardman et al., 2014), whereas the provision for adapted physical education varies considerably (Heck et al., 2020). Adapted physical education may need extra resources, be it more support staff, arrangements for peer guidance, not least modified equipment (Lieberman et al., 2020), and the availability of this may depend at local, regional or national levels. Countries can have different ways for educational placement, via general schools, special education classes, or even in designated or separate classes, as such programmes have their own context specific issues. The Kazan Action Plan was signed by the Ministers responsible for physical education and agreed on the need to disaggregate indicators by disabilities on the contribution of PE to the sustainable development goals (UNESCO, 2017).

Community and Environment

The Community & Environment indicator was graded in eight Para Report Cards, with an overall average grade of D+. The highest grade was from Ireland (B-) with data on safe neighbourhoods and availability of facilities to participate in PA (Ng et al., Review). Both Brazil and France assigned a grade of C+ for the Community & Environment indicator. In France, 68% of sport facilities were accessible to people with disabilities and between 47% to 55% of municipalities offered PA opportunities for CAWD, with 39% with local policies supporting inclusion of CAWD in sport clubs (Aubert, Verdot, et al., Review). Similar benchmarks were reported from Brazil, where 65% of municipalities had local policies to promote PA for CAWD, with most CAWD reported to

access facilities in their community, but only 41% had accessible infrastructure (Augustos et al., Review).

Between 25% to 55% of Israeli CAWD reported using a variety of PA facilities close to home, including parks and playgrounds, playing fields, swimming pools or community centres with PA programs, hence they assigned grade C- to this indicator (Hutzler, Barak, Tesler, et al., Review).

A grade of D+ was assigned in Chile, as 30%-43% of Chilean CAWD felt their neighbourhoods were safe, one-quarter (23%) reported taking part in community organisations for physical activities, although only 10% reported there were bike paths or skate parks near their homes. The grade was slightly lower in Lithuania (D), with evidence of 20 organisations in Kaunas (second city of Lithuania) reported to provide PA opportunities for CAWD, as well as the presence of policies in the 60 municipalities to deliver accessible PA facilities (Pozeriene et al., Review).

Although 65% of Spanish families live within 1km of sport centres or facilities, less than two out of ten Spanish sport facilities were accessible to people with disabilities, hence the grade was F.

Despite Canada had available data on 94% of parents of CAWD perceiving their neighbourhoods to be safe for their child to play outside, and that 71% of facility managers reported ice arenas and swimming pools were 'accessible', there seemed to be too much missing data to cover

Canada to provide a grade other than INC (Arbour-Nicitopoulos et al., Review). In the United States, 72% to 90% of CAWD reported their neighbourhoods were safe and there were places to play, however data were not specific to accessibility hence this indicator was also graded INC (Stanish et al., Review). Disaggregated data were lacking on the accessibility of facilities in Hong Kong and New Zealand, and any type of data on this indicator was not available in the Philippines, Poland and South Korea.

CAWD experience many barriers to PA at the environmental and community levels (Shields & Synnot, 2016). No grades were assigned from Para Report Cards in Asia and North America, yet the average grade from the other countries was C-. There were eight benchmarks for the

Community & Environment indicator, with one specific to CAWD. Although it was recognised as important by the development team to have a benchmark on the “percentage of CAWD with access to adapted physical activity or sport equipment”, no countries were able to report on this benchmark. Building on measures to assess against this benchmark is needed so that relevant data can be used by multiple data sources. Specific data in this area would build on the facility management knowledge that is needed for construction of spaces and places that promote meaningful participation in PA for families of CAWD.

The Chilean grade was based on five benchmarks based on four sources of data, although three of the studies did not disaggregate by disabilities which may lead to an over-reporting for this indicator. The high variation in community-based PA policy implementation across the Para Report Cards, as evidenced by the range of scores, also points to the need to strengthen the collaboration between communities and local government units. This includes improving the access of safe and inclusive spaces for CAWD, and harnessing family-community-local government partnerships in implementing and evaluating PA initiatives. Documentation and reporting also need to be improved as implied by the cited reason of lack of sufficient data for reported INC grades for nearly half of the countries.

Government Strategies & Investments

The average overall grade for the Government indicator was C and grades were assigned in 13 Para Report Cards. Only the United States and New Zealand reported insufficient evidence to assign a grade. There were nine countries (Brazil, Canada, Chile, Finland, Ireland, Philippines, Poland, South Korea and Spain) that used the HEPA Policy Audit Tool for the Government indicator (Ward et al, 2019).

There were 28 policy instruments in South Korea that had supporting actions, accountability within organisations, formal reporting mechanisms, monitoring and evaluation plans, as well as

identified specific funding in relation to PA and disabilities (Lee et al., Review) leading to an A+ grade. The grade was A- in Finland because the government policy documents were met by the provision of resources for all children and adolescents. There is the so-called dual strategy whereby adapted PA and sports for CAWD are provided in separated and inclusive environments as part of the non-discrimination action plans.

There were grades of B- and B from Chile, Ireland and Philippines, with 26, 30, and 10 policy documents respectively, with reference to people with disabilities. In addition to the documents, there are three laws in the Philippines that promote PA programmes like physical fitness, active transportation, and active play. Yet, reporting of its implementation was lacking.

Data from France (C+), Hong Kong (C+), Spain (C+), Israel (C), and Lithuania (C) were created from reviewing several documents, reports and consultation studies. Examples include, in the French national sport and disability strategy, there were 24 actions across six objectives around the following four themes: 1) promoting access to PA, 2) developing adapted ways for different needs, 3) improve performance at the 2024 Paris Paralympic Games, 4) management and evaluation (Aubert, Verdot, et al., Review). Whereas in Hong Kong, 6% of the overall expenditure on sports development and activities was allocated specifically to persons with disabilities, a small increase from the previous two years. In Israel, there is an emphasis in special education that emphasises to adapt individual goals in PE.

Future policy development could look to integrate policy and programmes on PA and sedentary behaviour into all relevant national policy and action plans. These would include the new *WHO Guidelines on physical activity and sedentary behaviour* published in 2020 which made recommendations for the first time for children (5-17 years of age) living with chronic conditions or disabilities (Bull et al., 2020). These recommendations included that CAWD should do at least an average of 60 minutes per day of moderate- to vigorous intensity, mostly aerobic, PA, across the week. Limiting sedentary time and the amount of recreational screen time were also advised.

Additional recommendations could also include adopting principles of universal design and health impact assessment into the development of future policy in order to also meet policy targets for several sustainable development goals (SDGs) including SDG3 “good health and well-being, SDG 10 “Reduced Inequalities”, SDG11 “sustainable cities and communities,” and SDG13 “climate action.” (Marmot & Bell, 2018).

Additional Benchmarks

Some additional indicators to the 10 core ones (e.g., Sleep, 24-Hour Movement Guidelines) were assessed in some Para Report Cards. For Sleep, in absence of specific benchmarks for the Global Matrix 4.0 to assess this indicator, it was evaluated using the recommendations suggested by the National Sleep Foundation’s recommendations (Hirshkowitz et al., 2015). Data on sleep were available from Canadian (68% to 87%), Spanish (76%), New Zealander (62%) and South Korean (40/%) CAWD who met the right amount of sleep (Arbour-Nicitopoulos et al., Review; Lee et al., Review; López-Gil et al., Review). In relation to the 24-Hour Movement Guidelines, only Canada and Spain reported information about this indicator. Since 24-hour movement behaviours cover the whole day (i.e., 24-h period), they are co-dependent and should be examined simultaneously (Dumuid et al., 2018), thus it would be interesting to include information about Sleep and 24-Hour Movement Guidelines in future editions Para Report Cards to better understand movement behaviours of CAWD from around the world.

Comparisons between Para Report Cards and Global Matrix 4.0

Overall, the grades from the Para Report Cards were lower than those in the Global Matrix 4.0 (Augusto & et, n.d.). This was expected, there is evidence to suggest that PA levels are **lower** among CAWD than in the general population (Martin Ginis, van der Ploeg, et al., 2021). This differences highlights the added risk of physical inactivity among CAWDs to their individual well-being and mortality, as well as societal health-keeping efforts. **The interpretation of data**

comparison should be made with caution, particularly where there were large data gaps specific to CAWD. Especially as grades may appear lower than in the general population, CAWD should be involved in any processes that look to address these findings. Good practice examples can be found from the production of the UK chief medical guidelines infographics (Smith et al, 2022).

There were 57 countries or regions who formed the Global Matrix 4.0 (Aubert, Barnes, et al., Review), of which about a quarter put together a taskforce to disaggregate their grades by disability to create the Para Report Cards. Much of the data were from the same sources used for the Global Matrix 4.0, for example, national surveys included a disability measure so that specific results on disabilities could be extracted. In other cases, targeted surveys on CAWD were conducted through self-report or proxy, as in parents or teachers. Under the rights of persons with disabilities, general data should be disaggregated by disabilities (UN, 2006). With over 180 ratifications globally, data may already be available from general surveys, yet resources to carry out the reporting may be lacking. Furthermore, without disaggregation by disability, overall grading may already be inclusive of disabilities, and thus grades may be under or over-reported in the general report without discussions of disabilities.

Strengths & Limitations

The major strength of this study was that the countries involved in this process followed processes based on those used in the Global Matrix 4.0. This included recruitment of teams within the AHKGA, using benchmarks specific to CAWD where required, external auditing of the grades, reporting the synthesis in a Global Matrix of Para Report Cards, and launching the series simultaneously.

Being the first Global Matrix of Para Report Cards, the study presents some limitations and corresponding recommendations for practice and research. First, 45% of potential grades from 15 countries and regions were INC, which was higher than the first Global Matrix (Tremblay,

et al., 2014), where 24% of grades were INC. Only six of the seven IFAPA regions were able to provide grades, missing out a potential global overview. Another recognized limitation is the generic nature of the grading criteria as applied to CAWD. Originally developed for the general Global Matrix, the benchmarks were unchanged other than to make it specific to CAWD. As such, grades might be seen as more actionable if they were designed from a disability specific knowledge base. Finally, different types of disability can be considered in future evaluation. At present, this paper provides the PA status of CAWD in a combined way with minimal breakdown by disability groups and other demographic factors. Hence, specific information pertaining to the context of different disabilities was not produced in this Global Matrix of Para Report Cards.

This Para Global Matrix exercise does not ignore the heterogeneity within the disability population but was focused to highlight similarities as a movement for and with people with disabilities. Furthermore, this Global Matrix of Para Report Cards demonstrates that CAWD can and should be involved in all forms of data collection where possible, as often has been the case that CAWD were in study exclusion criteria. Para Report Cards Cross sectoral work is just beginning through campaigns such as the #WeThe15 movement (Carty, Mont, et al., 2021), whereby the ethos of *stronger together* may be able to shine the light of individuals with disabilities to have the opportunities and to be more physically active. Between countries and regions, the data were cross-referenced with stakeholder groups who were able to represent CAWD. More details can be found in the brief reports as well as the SWOT analysis paper (Hutzler, Barak, Arbour-Nicitopoulos, et al., Review).

This is the first Global Matrix of Para Report Cards that provides an overview of the status of PA behaviours and influences among CAWD across regions, that supplement those Para Report Cards in this special issue. With growth in countries in the Active Healthy Kids Global Alliance, and more awareness of the connection between PA and CAWD at research and policy levels, it is anticipated that there would be a continued call for more Para Report Cards

Summary

Data on the extension to the 10 Global Matrix indicators for CAWD were available in 15 countries and regions from six of the seven IFAPA regions. This is a major advance in the global knowledge of PA for CAWD and sets a benchmark for further work in this area. Through more collaboration with the AHKGA and creation of Para Report Cards, more countries and regions around the world, particularly in low to middle income countries, may be able to engage in data collection and dissemination of data that is specific to PA of CAWD. Key points of discussion about data provision, benchmarks and indicators for CAWD have been presented to encourage global efforts to collect and report data after disaggregating by disability or incorporating PA into disability specific studies.

This Global Matrix is just one of the ways that may lead to comparisons within and between countries and regions over time. Such comparisons can help programme designers and policy makers adopt, adapt and share good practices to promote health and active living for CAWD. The average grades in this first Para Global Matrix were low for the behavioural indicators, suggesting an urgent need for intervention. Moreover, more countries and regions are needed to collect and report PA data on CAWD and produce Para Report Cards, that could support the creation of appropriate programmes and legislations to improve PA opportunities and behaviour.

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Tables & Figures

Table 1. Global Matrix of Physical Activity Report Card Indicators for Disabilities Rank Order by Grade

Supplement Table 1. Para Report Card Indicators and Benchmarks (adapted from Global Matrix 4.0).

Supplement Table 2. Sources of data and overall Para Report Card grades by IFAPA region.

Supplement Table 3. Global Matrix of Para Report Card indicator grades by Country

Figure 1. Global overview of countries involved in this global matrix with disability data with numbers indicating the number of core indicators with grades (maximum = 10).

Supplement Figure 1. Spread of graded indicators by IFAPA regions.