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Results From Venezuela's 2016 Report Card on Physical Activity for Children and Youth

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Background: The Venezuelan Report Card on Physical Activity for Children and Youth is the first assessment of information related to physical activity in Venezuela. It provides a compilation of existing information throughout the country and assesses how well it is doing at promoting opportunities for children and youth. The aim of this article is to summarize the information available. **Methods:** Thirteen physical activity indicators were graded by a committee of experts using letters *A* to *F* (*A*, the highest, to *F*, the lowest) based on national surveys, peer review studies, and policy documents. **Results:** Some indicators report incomplete information or a lack of data. Overweight and Obesity were classified as *A*; Body Composition and Nongovernmental Organization Policies as *B*; Municipal Level Policies as *C*; and Overall Physical Activity Levels and National Level Policies as *D*. **Conclusions:** 63% of children and youth have low physical activity levels. Venezuela needs to undergo a process of articulation between the several existing initiatives, and for said purposes, political will and a methodological effort is required. Investments, infrastructure, and opportunities will be more equal for all children and youth if more cooperation between institutions is developed and communication strategies are applied.

Keywords: obesity, epidemiology, sedentary behavior, fitness, policy

There is no doubt that noncommunicable diseases (NCD) are a global health concern and that obesity, type 2 diabetes, and cardiovascular diseases have been on the rise during the last decades at an alarming rate. In Venezuela, the leading cause of death is cardiovascular diseases, and the rates of type 2 diabetes and obesity have been increasing during the past decade.[1] The cost of the high prevalence of obesity and type 2 diabetes is not only economic, but also results in a deteriorated quality life for those who suffer from these diseases. It is a major topic of scientific, social, and policy making discussions, especially when there are concerns about productivity and wellbeing of societies. Thus, Venezuela is facing increases of these NCD while still dealing with undernutrition and communicable diseases.[2] This has been a complex scenario when addressing the right interventions because at least ideally the aim should be to provide care for those who are overweight and/or obese and compensate those who are undernourished while attending to the normal population.

Besides these challenges, the country is facing a relevant economic and social crisis in which the increase of poverty results in social disparities, constituting an obstacle for achieving the established international recommendations of physical activity (PA).[3] The last Standard Life Conditions Survey for Venezuelans 2015, conducted by 3 major universities in the country, reported that 53% of Venezuelan adults are not physically active, and the intensity of PA increases as socioeconomic status improves.[4] Similarly, childhood physical inactivity has reached levels that deserve media attention and public awareness. In this regard, figures published by the National Institute of Nutrition (INN) and reported from a national sample, 98.16% of obese children and youth, aged 7 to 12 years old, do not perform enough PA to meet the international recommendations. Out of those, 47.14% of overweight adolescents between 13- to 14-years-old were sedentary, and 47.71% performed light intensity activities.[5] On the other hand, inhabitants from low-income neighborhoods have reduced access to a healthy environment that could promote participation in PA, like sports practice or outdoor play. This is to say: poverty and socioeconomic status (SES) influences the level of PA in people living in disadvantaged conditions.[6,7]

Within this context, it is important to make a diagnosis of what the situation is in terms of the PA status in children and youth in Venezuela. Related information and figures are scarce and disorganized. International reports will mention the fact that governmental and nongovernmental actions for PA promotion are being taken but lack detailed description.[1] Identifying if children and adolescents are achieving the PA level recommended by national and/or international standard is relevant. In addition, identifying what areas do not have an availability of data are an important task to improve data compilation and information collection, so that the design of adequate public policies can be achieved. In consequence, interventions based on the results of this report card would help to increase PA level of these population groups and would promote benefits from PA, such as the prevention of chronic NCD at early ages.

To develop the Venezuelan Report Card according to the established rules of the steering committee and the Healthy Active Kids

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International core group for the previous countries report cards, a cooperative research group from different institutions was developed with the help of Active Healthy Kids Colombia.

The aims of this article are 2-fold: first, to summarize the results of the Venezuelan children and youth report card by a systematic review of relevant information, and secondly, to identify the areas in which the information is scant, to influence decision making through evidence-based information.

Methods

Researchers at the Central University of Venezuela developed and produced the 2016 Venezuelan Report Card by means of a cooperative program between the Center for Development Studies (CENDES), the Bioanthropology, Physical Activity and Health Unit (Bio An Unit) and the Bengoa Foundation for food and nutrition. In addition, Sucre County's department of health provided input through the director and epidemiology personnel. In addition, a Major's office representative was included.

Altogether the research working group (RWG) consisted of a total of 12 experts from the above mentioned institutions. CENDES and Bio An Unit members had been mentored by leaders from the Epiandes research group from Colombia, a team with experience in developing the Colombian report card in previous years. All the experts met 7 times, although the team at the Bio An Unit (librarians and research assistants) reviewed the literature since the beginning of the project, independent of these meetings.

The first step was a review of the available literature, to check the existing published national data reports and peer-reviewed journal papers. Parallel to this, an examination of the existing gray literature produced by major universities was performed with the aim to check the information contained in theses and/or dissertations at all graduate levels. National and local reports on physical activities and public policy actions for quality exercise programs and sports were equally reviewed for the development of this Report Card. This step included the development of the indicators; 2 meetings of the RWG were held for this purpose. Evidence was summarized for the design of 13 indicators classified into 3 categories according to associations with overall levels of PA. The first category comprised behaviors contributing to PA levels: 1) Overall PA Levels, 2) Active Transportation, and 3) Organized Sport Participation. The category Active Play was not included since neither national nor local information was available. The second category included factors associated with elevated cardio metabolic risk: 1) Sedentary Behaviors (screen-time), 2) Overweight (BMI for age > 1SD and ≤ 2SD), 3) Obesity (BMI for age > 2SD), 4) Below Health Fitness Zone (low cardiorespiratory fitness), and 5) Body Composition (body fat percentage above the 75th percentile reference by age and sex according to the sum of skinfolds). The third category comprised factors that influence PA: Policy. The indicators of School, Family, and Community and Built Environment were not assessed due to lack of national and/or local data. The Policy indicator was subdivided into 3 categories of initiatives: National, Local (state and municipal levels), and Nongovernmental Organization Activities. Primary sources of national data were the National Institute of Statistics (INE) and the National Institute of Nutrition[5] surveys and current policy governmental documents. Data from local state and municipal governments' policy documents were also included.

In the second step, a review of the grading system and criteria used in report cards from other countries was performed to select the grading scale and benchmarks to be used by the Venezuelan Report Card. The RWG held 2 meetings to define the benchmarks for each indicator and to discuss behaviors, environments, practices and policies in terms of potential reach, adoption and impact. The RWG agreed that grading through letters from A to F would be used since it was equivalent to the academic grading system used in most Venezuelan elementary and middle schools. Grades were based on criteria set by the Scientific Advisory Panel of South African Report Cards for 2007 and 2010,[8,9] and the benchmarks for the Venezuelan grading scale used models from Canada[10,11] and Scotland,[12] allowing comparisons against an ideal scenario while also identifying trends for moderate improvements in the future.[13,14] As a result, the Venezuelan Report Card grading scale was defined as follows: a grade of *A* indicates success in reaching the best results for the indicator for the majority of children and youth (81% to 100%), *B* indicates being successful with well over half of children and youth (61% to 80%), *C* indicates success with about half of children and youth (41% to 60%), *D* indicates succeeding with less than half, but some, children and youth (21% to 40%), and *F* indicates success with very few children and youth (0% to 20%).

The third step included meetings of the RWG that considered different perspectives on how the country is doing in gathering data, the respective analysis and promotion of PA. The RWG then held 3 meetings. The first one of those meetings was for discussing, along with Sucre County's personnel, the impact of health public policies and communication campaign for promoting PA in the county's children and youth. Then, 2 more meetings were held, during which the RWG assessed the available evidence for each indicator, considering the quality of evidence, trends over time, disparities in PA and risk factors, and international comparisons, and proceeded to give the grades average according to the selected scale.

It is important to note that due to a lack of national data in some indicators, and to cover some local disparities, the RWG decided to include local academic studies from different sources in this report card. National and local studies were individually scored and all were included for obtaining final results. Finally, an average was calculated as an overall grade for each indicator at the national level, including local and academic studies, when available. Comments and/or recommendations from the experts were also incorporated with the indicators and in explanatory notes.

To illustrate the report card, a cover story was developed according to the current situation in Venezuela. Baseball is a very important sport in Venezuela. Many of the Major League Baseball players are Venezuelans, and kids usually engage in its practice at an early age. But nowadays, several behaviors in the Venezuelan population have been changing, and due to the huge economic crisis in the country, there have been food shortages. Some of the changes include endless lines for buying basic food products. Thus, parents must take their children along with them, sometimes not even sending their kids to school for several days per week, and many times kids are not able to eat breakfast, depending on what is available at home.[4,15] These elements of Venezuelan daily life are included in this cover story.

Results and Discussion

The 2016 Venezuelan Report Card is the first assessment for compiling the existing information of about PA levels and enabling environments for children and youth in the country to the best of our knowledge. The cover of Venezuela's Report Card may be observed in Figure 1. All indicators were evaluated based either on national or local/community evidence. Grading scores are summarized in Table 1. Appendix Table 1 summarizes the grades assigned by the RWG for each indicator and the sources of the data.

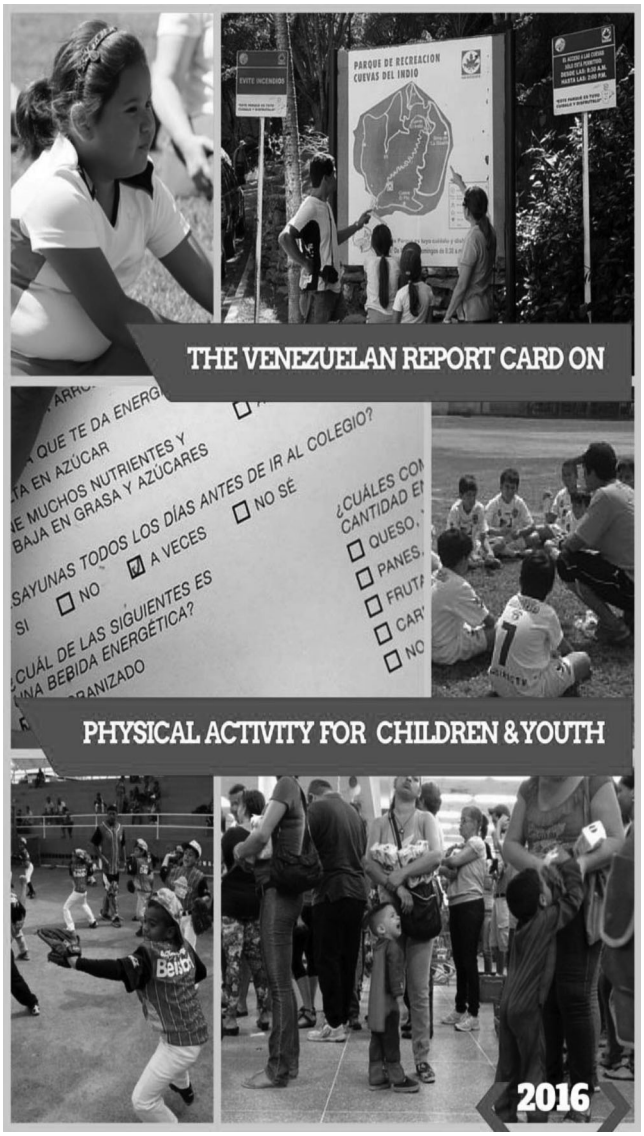

Figure 1 — Front cover of the 2016 Venezuelan Physical Activity Report Card.

Overall Physical Activity Levels: *D*

The grade of *D* for Overall PA Levels in children and youth was given based on 2 criteria: first, data from the National Institute of Statistics (INE)[16] reports that based on the WHO guidelines, the low levels of PA for the age group of 3 to 18 years do not meet the weekly time recommendations; and second, the data does not show detailed levels of intensity. Figures from the National Institute of Nutrition (INN) show that 9.8% of children between the ages of 7 to 12 were obese, and of those, 98.16% were sedentary. The data does not show the PA levels of the normal population.[5] However, published academic research shows high variability when assessing different communities. Grades from *F* to *A* can be observed through detailed assessment of PA levels and intensity in public and private schools in several regions in the country.[17–19] This shows that when adequate actions exist, the outcomes are positive, resulting in an outstanding performance.

Table 1 Grades According to Physical Activity Indicators in the 2016 Venezuelan Report Card on Physical Activity for Children and Youth

Indicator	Grades
Overall Physical Activity Levels	*D*
Organized Sport Participation	*INC*
Active Play	*INC*
Active Transportation	*D/F*
Time Spent in Sedentary Behavior	*D/F*
Overweight	*A*
Obesity	*A*
Below health fitness zone	*INC*
Body Composition	*B*
Family	*INC*
School	*INC*
Community and the Built Environment	*INC*
National Policy	*D*
Municipal Policy	*C*
Nongovernment	*B*

Note. The grade for each indicator is based on the percentage of children and youth meeting a defined benchmark: *A* is 81% to 100%; *B* is 61% to 80%; *C* is 41% to 60%, *D* is 21% to 40%; *F* is 0% to 20%; *INC* is Incomplete data. The grades assigned in this table are based on national studies and local academic studies; however, local studies and their given grades can be observed in detail in Table 2.

Active Transportation: *D / F*

A grade of *D / F* was assigned to the Active Transportation indicator based on the lack of national information and local data on the subject. Reports showed that no more than 21.4% of boys and 16.8% of girls either walk or bike to and from school for approximately 3 days during the week.[17,25]

Organized Sports Participation: *INC*

Despite a lack of national information, which resulted in a indicator grade of *INC*, of the 2 local studies one was graded *A* because 94.6% of the adolescents from public and private schools studied were engaged in vigorous PA in sports, such as swimming, volleyball, and basketball.[20] On the other hand, the second study was graded *F*; only 11% of the adolescents in the study sample spent their leisure time in sports activities.[26]

Time Spent Maintaining Sedentary Behavior: *D / F*

The information from national and local samples comprises a broad range of percentages for this indicator. In addition, the condition of sedentary behavior was pointed out in studies of overweight and obese children and adolescents. This is the case with a national study that reported 98.16% of the obese kids sample were not engaged in physical activities.[5] In the group of adolescents aged 13 to 14, the frequency of a sedentary lifestyle was 47.14%. Local reports derived from representative samples showed that about 40% of adolescents spent an average of 4 hours sitting in front of the TV, playing computer and video games, talking to friends, or taking a nap; during

the weekend usage increased sometimes up to 77.5%.[20,21,24,25,28] As it has been reported in several studies, physical inactivity was more frequent in girls and generally in overweight and obese children and youth.[17,27] These results should call the attention of private and governmental agencies to assume a greater emphasis on prevention and highlighted the protective effect of PA.

Overweight: *A*

A grade of *A* was given to this indicator based on information provided by a national sample in which a prevalence of 17.57% of overweight in children and youth aged 7 to 12 years was found, a prevalence that moderately decreases from age 13 years.[5] On the other hand, reports from different samples that cover the outskirts of major cities revealed a prevalence of overweight children that ranged mainly from 11.4% to 17%,[20,21,31–34,36] although 2 studies found as much as 30% to 32.1% of overweight children measured by BMI.[29,35] There was not a clear pattern of sexual dimorphism that assigned the condition to one sex or the other, although 2 papers reported an increased prevalence in girls and in those who attended private schools.

Obesity: *A*

The Obesity indicator received an overall grade was *A*. However, a note for clarification is needed: the classification for assessing obesity in a national sample resulted in a grade of *A* based on the criteria; overall, the prevalence of obesity in boys was 10.62% compared with 8.53% in girls.[5] The other national (academic) study was graded *B* because obesity in boys was 31.4% and 22.3% in girls.[32] This can be explained due to the sample sizes, but also the composition of these samples, showing that inequities and environmental conditions that Venezuelan population has been exposed to in the recent years have an influence on the presence of obesity, thus presenting a trend of lowering while the social scale descends. In both studies it is evident that low-income groups have become more food insecure and have difficulties accessing food, while affluent groups have access and may feed their families and children.[5,32,57]

Body Composition: *B*

This indicator was included based on its importance in assessing the body composition and fat distribution as a risk factor for developing cardiometabolic diseases in the future. In developing countries, where "the double burden of malnutrition" phenomena presents as the coexistence of obesity on one side of the population, while still working to eradicate undernutrition on the other side, anthropometric evaluation with parameters other than body mass index (BMI) is key.[2] It is important to create awareness of the identification of those children with normal BMI yet high percentages of fat or high central adiposity are present. Although there is a lack of national governmental data related to body composition, several local and academic national studies exist. In these existing studies, 12.7% to 36.6% of adolescents are reported to have high fat according to the results obtained by the sum of skin folds and high waist circumference values in children who do not perform enough vigorous physical activities; these values are less than 40% of the children in those studies[20,26]. Another study found a central adiposity distribution that reached 42% for boys and 44% for girls, being less than half of the children studied.[21] According to these results a grade of *A* / *C* was assigned to the above mentioned studies, which averaged to a grade of *B* for this indicator. It is important to highlight the fact that the existence of body fat distribution alterations, even in small percentages, cannot be considered as a success at this time. Moreover, the awareness of the consequences of early impairments in nutritional status have been supported by research since the pioneering research by David Barker related to the early origins of adult disease.[55,56] It is not a goal of this report card to engage in a detailed discussion about the early origin of diseases in Venezuela, but because of the relevance of identifying all stages of malnutrition, and the current situation of food shortage in Venezuela, the detailed analysis of body composition should be a priority.

Below Health Fitness Zone: *INC*

Though national data were lacking, scant information provided by local records showed overall that Venezuelan children and adolescents performed at levels of physical fitness that can be classified from moderate to poor, based on the resulting profile of aerobic PA and the 1000 m race.[39–41] One article reports that time spent on vigorous aerobic PA favors reaching a normal systolic blood pressure in 29% of adolescents aged 14 to 15.[38] Local data grades ranged between *C* to *F*, showing the high variability in the outcomes according to different geographical situations and contexts.

Policy: *D* / *C* / *B*

The constitution of the Bolivarian Republic of Venezuela has a legal framework that states the right to perform PA through article 111; it also says that the State shall guarantee resources for the promotion of sports and recreation to improve individual and collective lifestyles.[42] The grade *D* was given to National Policy due to the lack of specific and articulated action that permeates to all societal factors. Local government initiatives (Municipality Policy) also exist, and a grade of *C* was given based on the number of programs implemented by municipalities around the country.[46–52] Nongovernmental Organizations were given a *B* since they have a very detailed description of the promotion of activities; the number of actions taken and coverage is larger than central and local governments in this population group.[53,54] It should be noted that these initiatives are not officially coordinated; thus, an encouragement to work in alignment is important.

Strengths and Limitations

This is the first time the Venezuelan Report Card has been developed. The usefulness of having a diagnosis of the availability of data will definitely constitute a major contribution toward better actions for promoting PA at all levels in the near future. Having access to the representatives from the health and major's offices was, is, and will continue to be a strength for promotion of PA within the community. In addition, the initiative of an interinstitutional RWG is an important step toward integrated work that will promote PA in the most accurate and evidence-based way.

On the other hand, we had some limitations. The first one was that although grades were based on the best available data, there were significant research gaps, particularly in national documents. This should be addressed in the future to provide a more comprehensive and complete overview of the PA profile of Venezuelan children and youth. The need for more national input on environmental conditions and family, school, and community influence is relevant, as well as a continuous monitoring and evaluation of the established programs. These actions would improve availability of the necessary data for undertaking a multilevel approach that

allows better understanding on the PA levels of Venezuelan children and youth.

The local studies show the high variability of the achievement of adequate PA levels in children and youth, particularly within the school environment. This fact highlights the need for a methodological effort in structuring and designing studies that will measure PA levels with comparable methods across the country, identifying the influence of the many factors that interact with and ultimately constitute the PA profile of children and youth. It was difficult to assess the existing national and local policies due to the lack of structured design of the models of public policies, and difficulties in evaluating their interventions and programs.

Conclusion

The majority of children and youth in Venezuela are sedentary or perform low levels of PA. There have been national and local efforts to promote PA by national and local governments, as well as by the private sector and nongovernmental organization initiatives, but there are several elements in need of an update. First of all, the revision of the legal framework is imperative to include more updated evidence that allows the conceptualization of a model of public policies for PA that fits the real needs in the context of Venezuela. The huge economic crisis, social obstacles, and impoverishment of the population should be included in the formulation of a structured model of public policy so PA levels can be improved for the majority of the population. The next challenge is to translate evidence into practice to introduce changes that will improve health in these population groups.

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Appendix

Appendix Table 1 Grades According to Physical Activity Indicators in the 2016 Venezuela Report Card on Physical Activity for Children and Youth

Category	Indicator	Grade	Data for the grading	Sample	Age group	Source	Grade	Complimentary data from local studies	Sample	Age group	Source
Behaviors that contribute to physical activity levels	Overall Physical Activity Levels	D	In a national subsample, the levels of physical activity (PA) for the age group between 3–17 years showed 63% of insufficient activity• PA; 30.8% sufficient activity PA •• and 6.5% very active•••.	8,175,434	3–17 yrs.	INE, 2013[16]	F	In Lara 17.3% of the boys and 7.5% of girls engaged in physical activity at least 60 min for 5 days or more.	2070	12–16 yrs.	Granero et al, 2007[17]
							F	In Barinas 11.8% of boys and 4.8% of girls engaged in daily physical activity, for at least 60 minutes.	2249	13–15 yrs.	Granero, 2003[18]
							C	55.9% of preschool children a zone of Caracas presented a level of vigorous physical activity, especially in girls.	173	4–6,9 yrs.	Nava et al, 2011[19]
							A	In the Libertador county, Mérida 91.5% adolescents from public and private institutions reported moderate physical activity.	863	14–19 yrs.	Suárez Belandria et al, 2014[20]
							A	86% of adolescents from La Rinconada-Caracas, performed vigorous physical activity. The boys spent on average 2.17 days a week with a duration of 1 hr and 35 min each; girls 1.60 days during 1hr 52 min.	210	14–17 yrs.	López and Martínez, 2012[21]
							INC	A study in Valencia reported that boys were more active than girls, with a level of moderate physical activity.	150	14–17 yrs.	Díaz et al, 2012[22]
							B	65.6% of children in Caracas, spent 3 days or more a week performing moderate physical activity; while 34.4% spent less than 2 days a week for the same activity.	151	2–5 yrs.	Rodríguez, 2015[23]
							C	54% of the of preadolescents and adolescents practice less than 30 min per day of PA, and this behavior is higher in women (63%) than men (45%).	791	9–15 yrs.	Aliaga Salcedo and Landaeta Jiménez, In Press[24]

(continued)

Appendix Table *(continued)*

Category	Indicator	Grade	Data for the grading	Sample	Age group	Source	Grade	Complimentary data from local studies	Sample	Age group	Source
Behaviors that contribute to physical activity levels	Active Transportation	INC	Lack of national data				D/F	In Lara 21.4% of boys and 16.8% of girls walk or bike to and from school for 3 or more days weekly.	2070	12–16 yrs.	Granero et al, 2007[17]
							F	A study in adolescents from the city of Maracay, it was found that only 17.24% walks daily to get to school.	232	13–19 yrs.	Aguilar et al, 2010[25]
	Organized Sport Participation	INC	Lack of national data				F	In Caracas and Mérida 11% of adolescents spent their leisure time in extracurricular sports activities.	300	9–13 yrs.	Pérez et al, 2012[26]
							A	In the Libertador county, Mérida 94.6% of adolescents from public and private institutions reported vigorous physical activity in sports such as basketball, volleyball and swimming.	863	14–19 yrs.	Suárez Belandria et al, 2014[20]
	Active Play	INC	Lack of national and local data								
Factors associated with elevated cardiometabolic risk	Time spent in sedentary behaviors	D/F	In a national sample of overweight children and adolescents 7–12 years of age, it was found that 98.16% were not engaged in physical activity. The age group between 13 to 14 years with the same condition showed 47.14% of sedentary lifestyle	1545	7–14 yrs.	INN, 2013.[5]	B	In Lara 26.2% of boys and 29.6% of girls spent 3 h or more of their leisure time sitting in front of the TV or computer in a normal school day.	2070	12–16 yrs.	Granero et al, 2007[17]
			The obese group between 13-14 years old reported 48.15% of sedentary lifestyle.				B/A	In Barinas 22.8% of boys and 18.5% of girls engaged 3 hours or more in sedentary activities, like watching television, computer games or sitting with friends.	2249	13–15 yrs.	Granero, 2003[18]
							F/D	In Valencia 87.5% and 79.2% of obese and healthy children respectively, watch TV, computer or video games for 4 h or more.	160	7–11 yrs.	Angulo et al, 2014[27]
							F	Results from obese and healthy children from Valencia, depicted 96,6% and 81,9% respectively performing not enough physical activity.			

(continued)

Appendix Table ***(continued)***

Category	Indicator	Grade	Data for the grading	Sample	Age group	Source	Grade	Complimentary data from local studies	Sample	Age group	Source
Factors associated with elevated cardiometabolic risk	Time spent in sedentary behaviors						B	In the Libertador county, Mérida adolescents reported taking a nap (31.2%) and use the computer (35.1%) for at least 2 hours a day.	863	14–19 yrs.	Suárez Belandria et al, 2014[20]
							INC	The adolescents from La Rinconada-Caracas revealed that the time spent in sedentary behaviors (watching TV, sitting at the computer or in class) was daily on average 5 h 9 min for boys and 4 h 56 min for girls.	210	14–17 yrs.	López and Martínez, 2012[21]
							B	In a group of adolescents from Caracas, it was found that 40% were sedentary and 14.1% spent more than 5 hours per day on TV and video games activities.	85	11–13 yrs.	Herrera, 2011[28]
							C	In a sample of school children in the city of Barquisimeto, it was found that 56.3% of children with malnutrition by excess engaged 1 hr a day at least to physical activity.	180	9–11 yrs.	Agobian et al, 2013[29]
							C	In the Libertador county, Merida, the adolescents reported 49.3% of sedentary lifestyle	922	9–18 yrs.	Rincón et al, 2015[30]
							D	69.5% of children reported using on a 5 typical day digital media such as TV, computer and video games; during the weekend this usage increased to 77.5%.	151	2–5 yrs.	Rodríguez, 2015[23]
							D	A study in adolescents from Maracay, showed that 62.07% of the sample spends 2–6 h/day watching TV; 81.47% play less than 2 h/day games; 49.57% use the internet 2–6 h/day.	232	13–19 yrs.	Aguilar et al, 2010[25]

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Appendix Table ***(continued)***

Category	Indicator	Grade	Data for the grading	Sample	Age group	Source	Grade	Complimentary data from local studies	Sample	Age group	Source
Factors associated with elevated cardiometabolic risk	Time spent in sedentary behaviors						C	47% of sample use 2–3 hours daily on screen activities and 33% more than 4 hours per day.	791	9–15 yrs,	Aliaga Salcedo and Landaeta-Jiménez[24]
	Overweight	A	In a national sample, children and adolescents 7–12 yrs showed 17.57% overweight. Among 13 to 17 yrs the overweight stood at 12.03%. Difference by sexes, reported 15.35% (boys) and 13.73% (girls) overweight.	12,945	7–17 yrs.	INN, 2013.[5]	A	In the peri-urban area of El Hatillo county, Caracas, 17.1% of children and adolescents were overweight.	191	6–12 yrs.	Pérez et al, 2010[31]
			In 8 cities of Venezuela overweight ranged from 11.4% to 18.2% of boys and girls respectively.	1052	7–12 yrs.	Herrera Cuenca et al, 2013.[32]	A	In the Libertador county, Merida, 12.8% of adolescents were overweight, more marked in females from private schools.	863	14–19 yrs.	Suárez Belandria et al, 2014[20]
							A	A study in adolescents from La Rinconada-Caracas, showed 13.3% of boys overweight, versus 15.9% in girls.	210	14–17 yrs.	López and Martínez, 2012[21]
							A	In a study in Merida depicted 13.6% of overweight and obesity with a high association between this condition and prehypertension and hypertension.	385	11–19 yrs.	Camacho-Camargo et al, 2009[33]
							A	In a community of Maracaibo from public and private schools it was found 9.4% of girls and 9.6% of boys with overweight condition.	210	6–12 yrs.	Di Gianfilippo et al, 2013[34]
							B/A	The adolescents from the Baruta county, Miranda, presented high values of weight and height and 30% of overweight measured by BMI.	80	13–18 yrs.	Zambrano et al 2013[35]
							A	In a study in Merida State, children of second grade of elementary school reported 13.8% overweight.	370	7 yrs.	Paoli et al, 2009[36]
							A	In a sample from suburban communities of Baruta and El Hatillo county, Caracas, it was found 16.7% (boys) and 11.5% (girls) with nutritional excess.	112	3–16 yrs.	Hernández et al, 2011[37]

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Appendix Table ***(continued)***

Category	Indicator	Grade	Data for the grading	Sample	Age group	Source	Grade	Complimentary data from local studies	Sample	Age group	Source
Factors associated with elevated cardiometabolic risk	Overweight						D	In a sample of school children from Barquisimeto, 32.1% (girls) and 28.1% (boys) classified with nutritional excess.	180	9–11 yrs.	Agobian et al 2013[29]
							A	Adolescents from Libertador county, Merida, founded 9.5% of overweight.	922	9–18 yrs.	Rincón et al, 2015[30]
	Obesity	A	Children and adolescents 7–12 yrs reported 9.87% of obesity, presented the condition in a 9.33%, among 13-17 yrs. Overall, boys and girls reported obesity 10.62% vs 8.53% accordingly	12,945	7–17 yrs.	INN, 2013.[5]	A	Adolescents from La Rinconada Caracas, showed 4.7% (boys) and 2.44% (girls) of obesity.	210	14–17 yrs.	López and Martínez, 2012[21]
		B	In 8 cities of Venezuela it was found prevalence of obesity as 31.4% for boys and 22.3% for girls.	1052	7–12 yrs.	Herrera Cuenca et al, 2013.[32]	A	A study in Maracaibo, found a prevalence of obesity of 2.8% (girls) and 5.8% (boys).	210	6–12 yrs.	Di Gianfilippo et al, 2013[34]
							A	In a study in Merida State, children of second grade of elementary school elicited 9.7% of obesity.	370	7 yrs.	Paoli et al, 2009[36]
							A	The adolescents from Libertador county, Merida, reported 7.9% of obesity.	922	9–18 yrs.	Rincón et al, 2015[30]
							A	A study in adolescents from Maracay, presented 14.65% of obesity, in which 4.3% were morbidly obese.	232	13–19 yrs.	Aguilar et al, 2010[25]
	Below health fitness zone	INC	Lack of national data				F	In Merida 29% of adolescents who performed 105 min of vigorous aerobic physical activity once a week, had high systolic blood pressure, compared with 10% who performed 120 minutes per day, 5 times a week of the same type of activity.	101	14–15 yrs.	Madariaga and Donís, 2014[38]
							INC	The physical fitness profile was evaluated in a group of adolescent from Apure State, through the 1,000 meters race; boys proved to have greater aerobic capacity than girls.	113	6–14 yrs.	Alexander and Méndez-Pérez, 2014[39]
							C	The maximum consumption of $V0_2$ was evaluated to assess aerobic fitness, a future cardiovascular risk of 46% in boys and 53.1% in girls was recorded.	250	11–16 yrs.	Padilla and Lozada, 2012[40]

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Appendix Table ***(continued)***

Category	Indicator	Grade	Data for the grading	Sample	Age group	Source	Grade	Complimentary data from local studies	Sample	Age group	Source
Factors associated with elevated cardiometabolic risk	Below health fitness zone						C	In a study in young athletes of the Education Unit of Sports Talents of Barinas State, the male athletes reported on average a maximum consumption of oxygen greater than their female counterparts (54.41 and 44.37 respectively); in consequence, the boys presenting a better aerobic performance.	481	12–18 yrs.	Padilla. 2014[41]
	Body composition	B	A study conducted in 8 cities of Venezuela, it was found that 26.5% of the evaluated subjects have a fat percentage above the 75th percentile reference value according to age and sex.	1052	7–12 yrs.	Herrera Cuenca et al, 2013.[31]	B	In the Libertador county, Merida, 36.6% of adolescents presented a high percentage of body fat.	863	14–19 yrs.	Suárez Belandria et al, 2014[20]
							A	In Caracas and Merida 12.7% of adolescents have high fat reserves, especially boys in the area of Caracas.	300	9–13 yrs.	Pérez et al, 2012[26]
							INC	In Merida, the waist circumference was significantly higher in adolescents who performed 105 min of vigorous aerobic physical activity once a week, compared with those who engaged 120 min daily, 5 times a week of the same type of activity.	101	14–17 yrs.	Madariaga and Donís, 2014[38]
							C	A group of adolescents from La Rinconada-Caracas, reported data of central adiposity as much as 42% for boys and 44% for girls respectively. Fact that increase early risks for cardiovascular diseases.	210	14–17 yrs.	López and Martínez, 2012[21]
							INC	A study performed in young athletes from the Education of Sports Talents Unit of Barinas state, showed in girls a marked superiority of the sum of skinfolds compared with boys with an average of 73.26 cm and 113.72 cm for male and female respectively.	481	12–18 yrs.	Padilla, 2014[41]

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Appendix Table *(continued)*

Category	Indicator		Grade	Data for the grading	Sample	Age group	Source	Grade	Complimentary data from local studies	Sample	Age group	Source
Levels of influence	Family	INC	Lack of national and local data									
	School	INC	Lack of national and local data									
	Community and built environment	INC	Lack of national and local data									
	National Policy	D	The Constitution of the Bolivarian Republic of Venezuela has a legal framework that guarantees the right to physical activity Article 111: "Everyone has the right for sport and recreation as activities that benefit the quality of individual and collective life. The State assumes responsibility for sports and recreation as education policy and public health and ensures the resources for promotion (...) "	N/A	N/A	Constitución de la República Bolivariana de Venezuela, 1999.[42]					
			The Organic Law of Sports, Physical Activity and Physical Education includes the entire population regardless of gender or age, and whose articles indicate the main functions of the state and private institutions, to strengthen physical activity, providing the infrastructure in the country, availability of space and appropriate facilities for practice and regulatory enforcement in the basic education subsystem.	N/A	N/A	Ley Orgánica de Deporte, Actividad Física y Educación Física, 2011.[43]					
			National Fund for the Development of Sport, Physical Activity and Education Physics (FONADED): according to the provisions of Article 68 of the law of sport, the fund is created with the contribution of 1% of the income of public and private enterprises or other organisms created to perform economic activity in the country for profit and whose net income or annual accounting profit exceeds 20,000 tax units.								

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Appendix Table ***(continued)***

Category	Indicator	Grade	Data for the grading	Sample	Age group	Source	Grade	Complimentary data from local studies	Sample	Age group	Source
Levels of influence	National Policy		Biohealthy parks have been a proposal adopted by the Ministry of Popular Power for Youth and Sports and implemented through the National Sports Institute (IND). At the national level for the first year of installation (2012-2013) there were 44 parks located in the following states: Vargas (13), Distrito Capital (11), Miranda (6), Zulia (2), Aragua (2), Trujillo (2), Guárico (2), Anzoátegui (1), Falcón (1), Táchira (1), Carabobo (1), Lara (1), Cojedes (1).	N/A	N/A	García-Avendaño and Rodríguez. 2015.[44]					
			INPARQUES: The National Parks Institute is responsible for 43 national parks, 36 natural monuments and 65 recreational parks, which occupy about 16% of the national territory. Recreation parks have courts for sports and leisure activities; likewise national parks have spaces for sports, hiking, camping and other sporting activities.	N/A	N/A	Ministerio del Poder Popular para el Ecosocialismo y Aguas (official web site)[45].					
	Municipal		Baruta municipality organizes neighborhood sports games in the following sports: volleyball, beach volleyball, kickball, baseball, basketball, softball, futsal, soccer, athletics, duathlon, aerobithón, swimming, tennis field, domino, table tennis and cycling (road). In addition it has 12 sports centers with a total of 11 multiple fields. On the other hand, the Sports Schools teach basketball, baseball, soccer, futsal, kickball, swimming, tae kwon do, volleyball and wushu for children between 4 and 14 years old.	N/A	N/A	Alcaldía de Baruta (official web site).[46]					
	C		Sucre municipality has the Autonomous Institute of Sport and Recreation (I.A.M.D.E.R.) whose aim is to promote sport as an strategy for recreation and health of the inhabitants of the municipality. In addition, It has a vertical gym where teach sports such as athletics, weights, futsal, volleyball, basketball, karate, taekwondo, judo, jui jitsu, kung fu, yoga, dance classes, TRX and boot camp, boxing, chess, artistic gymnastics and sports for people with disabilities.	N/A	N/A	Alcaldía de Sucre (official web site).[47]					
			Chacao municipality has a vertical gym that offers various physical and sports activities for residents. It also has sports recreation and training initiatives such as moving the street; yoga on the street and Tournament of colors. Sports schools: fitness and sports methodology; school sports leadership and sports training.	N/A	N/A	Alcaldía de Chacao (official web site).[48]					

(continued)

Appendix Table ***(continued)***

Category	Indicator	Grade	Data for the grading	Sample	Age group	Source	Grade	Complimentary data from local studies	Sample	Age group	Source
Levels of influence	Municipal		El Hatillo municipality, has a sports center where practiced football, basketball, volleyball, yoga and dance classes. Also has 2 "Sports Routes" 1) La Lagunita (circuits for trotting 6K, 8K and 12K, in addition to activities that complement as yoga, zumba, tai chi and functional training) and 2) El Volcán (Circuit mountain to downhill and mountain climbers they wish to climb and walk). Ultimately, it has the Municipal League of soccer, which included schools in El Hatillo and other municipalities of Caracas.	N/A	N/A	Alcaldía El Hatillo (official web site).[49]					
			Libertador municipality has the Municipal Institute of Sport and Recreation (IMDERE) responsible for implementing plans and sports and recreational activities. Among the initiatives, there is the public bike system that drives its use as a means of transportation and recreation. It has 5 stations for a total distance of 6 km; serves from Monday to Saturday from 8 am to 5 pm. In addition, is "Caracas Freewheel Plan" program launched in 2012, which promotes recreation and physical activity; It consists of 4 stations covering a total of 12 km of travel. Serves on Sundays from 7 am to 3 pm.	N/A	N/A	Alcaldía de Caracas (official web site).[50]					
			Valencia municipality, has an Institute of Sport in charge of the rehabilitation of spaces sports, donation of sports equipment; initiatives such as JUDEMCA sports games and Valencia Win Neighborhood	N/A	N/A	Alcaldía de Valencia (official web site).[51]					
			Barquisimeto has the Municipal Institute of Sport and Recreation Iribarren (IMDERI) carrying out programs like: sports with you, playmaking of future, cycling with people, activate your field, checkmate, open field, active Sunday, sports without barriers and Barquisimeto in motion.	N/A	N/A	Alcaldía de Iribarren (official web site).[52]					

(continued)

Appendix Table ***(continued)***

Category	Indicator	Grade	Data for the grading	Sample	Age group	Source	Grade	Complimentary data from local studies	Sample	Age group	Source
Levels of influence	Nongovernment	B	Criollitos de Venezuela: It is a training institution of baseball for children, present in most part of Venezuela territory. Since 2005 the institution brought together more than 100,000 athletes between 5 and 19 years; for 2006, a census of 135 assigned leagues in 24 states and more than 5,220 teams participating in different categories at national level.	N/A	N/A	Criollitos de Venezuela (official web site).[53]					
			Empresas Polar Foundation allocates investments in various sports schools throughout the country, mainly promoting football, baseball and basketball. It also has community development programs for Recreation and proper use of leisure time which aims to develop the capacities of individuals, families and community organizations that allow cultivate good physical and spiritual health as well as social and family life.	N/A	N/A	Fundación Polar (official web site)[54]					

Note. According to the National Institute of Nutrition (INN)[5] and the National Institute of Statistics (INE) the categorization of PA levels is as follows:

• Insufficiently active (low):: The population reports an amount of physical activity below the requirements for the other categories, or no physical activity;

•• Sufficiently active (moderate): They have at least 3 days of vigorous activity for 20 minutes or more;

••• Very active: there are 3 days or more of vigorous physical activity for 30 minutes or more (eg, moderate to intense walking for more than 30 minutes a day are performed for 3 or more days per week).