

Pilot Study 2022, Bogotá

**Why and how to Measure the  
*Physical and Psychological*  
*Well-being* of Adolescent Students**



# Why and how to Measure the *Physical and Psychological Well-being* of Adolescent Students

**Note:** This is an interactive document. URLs and some elements marked as this rectangle or in bold in the footnotes are links to other contents.

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*This document had inputs and technical comments of Andrés Morales (UNESCO), Lucía Costa (UNESCO), Julio César Guanche (UNESCO), Nicolás Reyes (UNESCO), Eduardo Vásquez Torres (UNESCO).*

*Authors: Gustavo Tovar, Javier Gutiérrez, Felipe Alejandro Riveros C. Karina Claudia Bothert Ortiz, Martha Elena Fajardo Sandoval, María Cristina Ospina Medina*

*Graphic design: Felipe Alejandro Riveros, Chingüiro Studio*

*Translation into English: Cecilia González*

# The Study, its Usefulness and Replicability

The purpose of the present study is to review and update methodologies, tools, and instruments for measuring physical and psychological well-being among students in Bogotá, as part of the aim to strengthen comprehensive education in the city, especially in the post-pandemic period.

The study provides reliable, scalable, and standardised measurement tools and methodologies that can be applied within a reasonable term, at the discretion of schools, boards and any educational institution or authority that wants to apply them, in any jurisdiction (either public or private, urban, or rural, educational, or public health-related), in any country or city in the world, to 9<sup>th</sup> grade students.

The entities that are part of the institutional alliance that has developed this study, that is, the Technical Committee, composed by IDEP (Educational Research and Pedagogical Development Institute), UNESCO (United Nations Educational, Scientific and Cultural Organization), UNDP (United Nations Development Programme), and SaludHable, and the Advisory Committee, composed by SED (District Secretary of Education), SDS (District Secretary of Health), IDRDI (District Recreation and Sports Institute), and JBB (Bogotá Botanical Garden), make openly available their contact

details (at the end of this document) and relevant information as required.

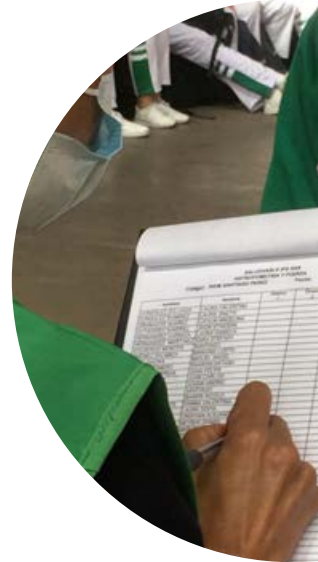
## How this Study was Born

A periodic, reliable, and comparable measurement of 15-year-old students has been sought for worldwide which could be applied in a similar way to cognitive tests such as PISA and Saber (national cognitive standardised tests), in other dimensions of comprehensive education, in this case, the physical and psychological well-being. The periodicity and accuracy of the assessments would contribute to the development and strengthening of public investment plans and policies, and the strengthening of inclusive comprehensive education initiatives, in this case, of physical and psychological well-being, in the educational institutions along the city and the country.<sup>1</sup>

To that end, and as it is stated in the 2020-2024 district development plan, within the framework of its *research program for the closing of gaps between public and private schools, and the curricular and pedagogical transformation in Bogotá, through the multidimensional assessment system and 21st century skills development*, IDEP has entered into a technical cooperation partnership with UNESCO and UNDP to carry out, with the advice of the SaludHable team, the first

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1. In this regard, UNDP states that standardised knowledge assessments, such as the pilot phase of the physical and psychological well-being tests implemented under the agreement between UNDP, IDEP and UNESCO, provide relevant and timely information on female and male students' learning. Results achieved by educational institutions, families, governments, and society as a whole in other areas that are not usually evaluated can be known.





phase of a research on body and education, which gives rise to the present pilot study.

The study also considers UNESCO's mandate to promote comprehensive and quality education, in its capacity as the United Nations agency responsible for promoting Sustainable Development Goal 4: *Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.*

Through its *Fit for Life*<sup>2</sup> initiative, UNESCO also promotes physical education, physical activity, and sports. This initiative, within which the present study is included, seeks to strengthen national and local governments capacities in the collection of evidence that helps improve the physical well-being of all people, as part of the recovery from COVID-19.

Thus, during the second semester of 2022, a group of at least three hundred 9<sup>th</sup> grade students from five schools in the towns of Tunjuelito and Los Martires (two areas of the city of Bogotá) were evaluated, after having been chosen based on their diverse demographic characteristics, systematising the process, and collecting the methodology, the results, and the lessons learned (which are included at the end of this document.)

2. <https://www.unesco.org/es/sport-and-anti-doping/fit4life>



## Physical and Psychological Well-Being within the Framework of Comprehensive Education and in a Post-Pandemic Context in Colombia and Latin America

More than as a sum of knowledge, we understand *comprehensive training*<sup>3</sup>, which is the basis of a quality education, as that which combines all the dimensions and the full potential of each person in an integral development that is harmonious with himself or herself, with other human beings and with the environment.

This training includes, in addition to students' cognitive development and socio-emotional and citizen education, the possibility of putting in motion and exercising their motor and *corporeality*<sup>4</sup> skills.

3. *Comprehensive training* is directly linked to the pedagogical task and the carrying out of said task on a daily basis, where the context of the students and the institutional reality converge, unlike *comprehensive education*, which corresponds to the purposes and aims of education, i.e. the latter would be framed within educational policies. In this regard, we recommend seeing: IDEP (2021) *Formación integral en los colegios oficiales de Bogotá: Desafíos y perspectivas*. Public policy note n.º 5 (June 29). <http://www.idep.edu.co/sites/default/files/nota%205%20definitiva%20pdf.pdf>

4. "As "it is known," the body bears knowledge, marks and biography, individuality and sociability. It is the territory where aesthetics, senses, and meanings of others and the other are articulated, and is therefore the expression and communication of human subjectivity. It plays both in the public and private spheres, being in constant construction-deconstruction, learning, becoming, and changing. It is a social and cultural representation, because it is socially and culturally shaped and constituted, which gives it a symbolic dimension, or better yet, metaphor of the individual experience of being a body:" Arcila, J. (2016). *Corporeidad, arte y escuela*. *Magazín Aula Urbana*, (97), 3-4. <https://revistas.idep.edu.co/index.php/mau/article/view/343>



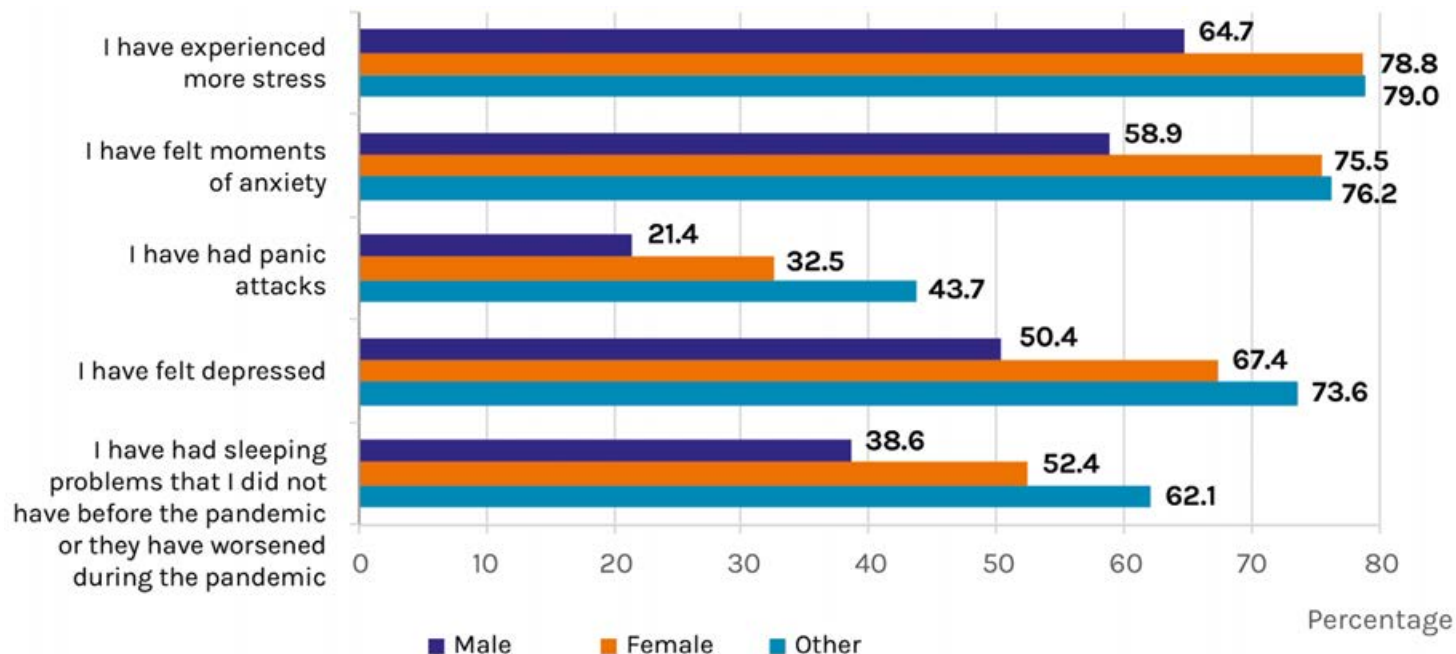
Although historically there have been advances in this educational integration in Colombia and Latin America, the COVID-19 pandemic and the isolation measures adopted, have put on the table the importance of physical and emotional well-being, especially in adolescents, as various recent studies show<sup>5</sup>.

The educational system, therefore, has the urgent task of offering new generations with a different option from experiencing the physical and psychological deficiencies suffered by the adult population of today,<sup>6</sup> including the consequences of confinement.

An atmosphere of health and well-being in education is, then, as important as a good résumé, especially for persons so sensitive regarding satisfaction with their body and mood, such as adolescents.<sup>7</sup>

5. We still lack evidence and standardised measurement mechanisms that allow us to know the impact of the pandemic on adolescents and young people. However, there are two documents that show this impact: the **Second United Nations survey on Latin American and Caribbean youth within the context of the COVID-19 pandemic** (of 2022): <https://repositorio.cepal.org/handle/11362/48203> and the **Guide for learning recovery and acceleration** of the World Bank, UNESCO and other entities (2022): <https://thedocs.worldbank.org/en/doc/e52f55322528903b27f1b7e61238e416-0200022022/related/Guide-for-Learning-Recovery-and-Acceleration-06-23.pdf>

Figure 1. **Prevalence of Mental Health Symptoms by Gender** (In percentages) (from the *Second United Nations survey on Latin American and Caribbean youth within the context of the COVID-19 pandemic*)



**Source:** Prepared by the authors, based on the Second United Nations Survey on Youth in Latin America and the Caribbean in the Context of the COVID-19 Pandemic. **Note:** Multiple choice question.

6. According to the World Health Organization (WHO), today's (2020) adolescents fall out of the expected range of physical activity, even more so than adults: "Worldwide, 81% of adolescents aged 11-17 years had not done enough physical activity in 2016. In addition, 85% of female and 78% of male adolescents did not comply with WHO recommendation of doing at least 60 minutes a day of moderate to intense physical activity." This makes us think that, even if we do not take any measure, they will be even more sedentary adults than the adults of today. More information in: OMS (2020). **WHO guidelines on physical activity and sedentary behaviour.** <https://apps.who.int/iris/bitstream/handle/10665/337004/9789240014817-spa.pdf>

7. Many theories and authors claim that adolescence is a time of crisis. This is not at all absurd, as the word "crisis" refers to a decisive change in the course of an evolution, as well as a sense of "being present" through the changes observed. However, this does not imply a total discontinuity or a break with everything that came before, and even less with that which follows.

Figure 2. Some Figures to Start the Dialogue

## COLOMBIA<sup>8</sup>



31.02%



According to the DANE, **31.02%** of the Colombian population (**15,454,633** people) are children or adolescents.



85.80%



About **85.80%** of the young population have reached **educational levels** which are **equal to or lower than middle education**.

### Pandemic

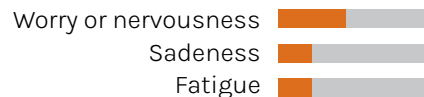
The mental health of the young population has become even more relevant in the context of the COVID-19 pandemic.



1,035 suicides

In **2020** there were **1,035 suicides** among people aged **15 to 29**. These cases represent **38.1%** of the total of suicides and the **16.3%** of deaths at these ages.

Additionally, **negative feelings** are more prevalent among young people (**14 to 28 years old**) who **do not study or work**:

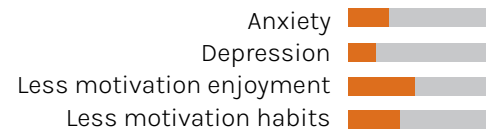


For example, **40.7%** have felt **worry or nervousness**, **16.8%** **sadness** and **16.5%** **tiredness**, between July 2020 and July 2021.

8. Encuesta Pulso Social, Departamento Administrativo Nacional de Estadística (DANE), 2022.

9. UNICEF, **Voices of Youth, 2020**, a survey carried out to 8,444 adolescents and young people aged 13 to 29 in nine countries and territories of the region. <https://www.unicef.org/lac/el-impacto-del-covid-19-en-la-salud-mental-de-adolescentes-y-j%C3%B3venes#:~:text=UNICEF%202020%20Entre%20las%20y,en%20los%20%C3%BAltimos%20siete%20d%C3%ADas>

## LATIN AMERICA AND THE CARIBBEAN<sup>9</sup>



**27%** of young people report feeling **anxiety** and **15%** **depression**.

**46%** report having **less motivation** to do **activities they used enjoyed**. **36%** feel less motivated to do **regular activities**.

### Pessimism



**43%** of **young women** feel pessimistic about the future, compared to **31%** of **young men**.



The fact that **73%** of **young people** have felt the need to ask for help in relation to their **physical and mental well-being** is of great concern and a call to national health authorities.



**40%** **has not asked for help**.

## WORLD

### Physical activity before and during the pandemic

Worldwide, **81%** of adolescents aged 11 to 17 had not done enough physical activity in 2016.



→ **40% decrease** in physical activity during the pandemic.

→ **64%** of young people report that **their physical health has been affected by the pandemic**.<sup>10</sup>

**85%** of female adolescents and **78%** of male adolescents **HAVE NOT complied with the WHO recommendations** of doing **at least 60 minutes a day** of moderate to intense physical activity.<sup>11</sup>

10. *Second United Nations survey on Latin American and Caribbean youth within the context of the COVID-19 pandemic*.

11. World Health Organization (2020), *WHO Guidelines on physical health and sedentary behaviour*.

# Main Milestones in the Measurement of Physical and Psychological Well-being in Adolescent Students

To know more milestones, please click (on each item):

1. Milestones in **psychological well-being assessments on a global scale**.
2. **Global Physical Wellness Assessment Models** (click here for **source documents**).
3. Milestones in **psychological well-being research in Colombia**.
4. **Other milestones in evaluation of psychological and physical well-being in Bogotá**.
5. **Guidelines for the promotion of physical activity worldwide** (click here for **source documents**).

## In the world

### The Playground Association of America Athletic Badge (1913, 1916)

Develops first set of tests for childhood, with a focus on sports performance.

### Bradburn and Caplovitz (1965)

Question the idea that human happiness is an unapproachable issue for science (Adaptive Behaviour Scale.)

### Fitnessgram (1982)

The Cooper institute (USA) conducts and leads school studies.

### European Council (1983)

The Eurofit test manual proposes the Z statistical value, comparative in the physical fitness of boys and girls.

### Adelman, Taylor, and Nelson (1985)

Study the dissatisfaction of boys, girls and adolescents under different living environments.

### Huebner (1991-94)

Develops scales related with psychological well-being in childhood and adolescence.

### Salotti and Paulal (2006)

Present the BIEPS-J (psychological well-being) and ACS (coping strategies for adolescents) scales, adapted by Casullo (2002).

### Institute of Medicine of National Academy of Sciences (2012)

Publishes *Fitness measures and Health Outcomes in Youth*.

### Kraus and Hirschland (1953-54)

The national youth fitness testing movement uses minimum fitness values and relates them to health.

### C.A.H.P.E.R (1966)

The Canadian Association for Health, Physical Education and Recreation develops the *Fitness-performance test* for ages 7-17.

### Harter (1982)

First studies related to psychological well-being in childhood and adolescence.

### Diener (1984)

Promotes the consideration of psychological well-being for scientific study.

### YMCA (1989)

This Christian youth association publishes the *Youth Fitness Test Manual* in the USA.

### Lox and Rudolph (1994); De Gracia and Marco (1997)

Find a direct relationship between physical-sports activity and psychological well-being.

### Reigal, Videra, Parra and Juárez (2012)

Find the relationship between the practice of physical-sports activity in adolescence and various self-assessments; physical self-concept, health perception and life satisfaction.

### Guillamón, García and Pérez (2017)

Find the relationship between physical condition and emotional well-being of schoolchildren of four public schools in Spain.

## In Colombia

### Jaúregui (1993)

Presents the *Physical Fitness: Standardised tests in Colombia* manual.

### Ballesteros, Medina and Caicedo (2006)

Investigate the relationship between psychological well-being and living conditions, from a psychological consultation service in Bogotá.

### SED-U. del Rosario (2014)

Present the *SER tests* of physical well-being, through the dimension of physical condition.

### ICBF (2015)

Ensin Survey.

### SED-U. del Rosario (2015)

Publishes the *Physical well-being evaluation* from a comprehensive training of the human being and validate the Fuprecol test.

### Álvarez, Vargas and Salazar (2018)

Study the relationship between family functioning and psychological well-being in adolescents.

### Aparicio-Gómez (2020)

Investigate the quality of life in children, adolescents and young people attending school during mandatory family confinement in Bogotá due to COVID-19.

### Bahamón, Alarcón, Cudris and Trejos (2020)

Explore the strategies used for the enhancement of psychological well-being in adolescents.

### ICBF (2005)

National Nutritional Situation Survey (Ensin).

### ICBF (2010)

Ensin Survey.

### Letter Report Physical Activity Colombia (2014)

Internationally reports the state of Colombian policies regarding the promotion of physical activity.

### Rodríguez, Gualteros, Torres, Umbarila and Ramírez (2015)

Associate muscle performance with physical well-being between ages 9 and 17.

### Uribe, Ramos and Villamil (2018)

Relate coping strategies and psychological well-being in adolescents.

### Bahamón, Alarcón and Trejos (2020)

Define the psychometric properties of the RYFF psychological well-being scale in adolescents.

### Martínez-Torres and Gallo-Villegas (2022)

Determine the normative values of grip strength in Colombian children and adolescents aged 6 to 17.





## The Bogotá Experience

In 2014, Bogotá implemented a first measurement<sup>12</sup> of physical well-being to about 41,000 9<sup>th</sup> grade students of public schools from all the towns in the city. In 2015 this measurement was expanded to a similar universe of 56,000 students. These implementations were preceded by a first pilot study carried out in 2013 and another carried out in early 2014.

The results of these tests, applied to students aged 15 years on average, showed that the adolescent participants are below international standards in every physical well-being measurement carried out, and that there is a large gender gap that favours male adolescents.

The experts who worked on the tests, eventually recommended Bogotá **to apply these measurements periodically**, so that they could become an indicator of the students' health and well-being, and a factor for the prevention of cardiometabolic diseases, considering that district schools care for most of the adolescent population in the city and that many of these teenagers do not attend school on a full day basis, which facilitates the planning and resources for this type of activities.



12. It was a census measurement in district schools—that is, it was applied in all official schools in Bogotá—that included a sample of private schools in the city, as well as schools under contract or concession by the capital district. To view the documents, click here: [https://drive.google.com/drive/folders/1af1sUOWhZ0hoTFTG\\_eunUoYxi54JPCx0?usp=share\\_link](https://drive.google.com/drive/folders/1af1sUOWhZ0hoTFTG_eunUoYxi54JPCx0?usp=share_link)

# Instruments Selected for the 2022 Study in Bogotá

The study consists of two components: **psychological well-being** (station 1) and **physical well-being** (stations 2, 3 and 4.) For the physical measurement, internationally known tests, such as the Leger test and the strength tests, were used, and to measure psychological well-being, the BIEPS-J scale was applied.

## PSYCHOLOGICAL WELL-BEING COMPONENT

**BIEPS-J Scale** (for adolescents, by María Martina Casullo): This instrument is composed of thirteen items and considers the following dimensions: *control of situations* (feeling of control and self-competence), *psychosocial bonds* (quality of personal relationships), *projects* (life goals and purposes) and *self-acceptance* (feeling of well-being with oneself). It is an instrument that presents evidence of convergent and divergent validity, as well as adequate reliability indexes at a global level, found in countries such as Argentina and Peru.

The instrument was designed in a Likert-type format, and each element had three options: a) disagree; b) neither agree nor disagree; and c) agree. This way, a total score was achieved, along with one for each dimension. It was proposed that the sum of the items would reflect the individual's psychological well-being

in a direct sense, that is, the higher the score, the greater the psychological well-being.

## PHYSICAL WELL-BEING COMPONENT

**Morphological component:** The weight to height ratio is one of the health indicators that should be monitored at any age, and it is crucial in schoolchildren due to the consequences for their proper growth and development.

The anthropometric measurements that should be taken are: weight, height, abdominal and arm circumference, and arm skinfold thickness. Body composition allows to evaluate the nutritional status of each adolescent. It is both a health outcome and a prognosis.

Body composition is operationally considered as a component, resulting from fitness, and is, in turn, a health marker.

Anthropometric indexes are combinations of body measurements of weight, height, and age. With those values, the following indexes are calculated: The *height index for age*, which allows to evaluate low height (growth failure), and the *body mass index for age*, which allows to evaluate normal weight or its alterations, such as inferior to normal weight, and excesses, such





as overweight and obesity. Other values that have gained importance and it is recommended to measure are the *abdominal and arm perimeter or circumference*, and the *arm skinfold thickness*, which allow to know body fat distribution.

**Muscle fitness measurement:** The musculoskeletal condition (*fitness*) will be measured based on the maximum grip strength in the dominant arm and the muscle power through a long jump. Strength is associated with better cardiovascular, skeletal and bone health, and with a higher self-esteem. Additionally, musculoskeletal fitness is a multidimensional construct that encompasses three components: *muscle strength, muscular endurance, and muscular power*. There is an increasing number of measurements supporting the use of these two tests as evidence of health-related musculoskeletal fitness in young people. Both upper and lower limbs are measured as follows:

- **Upper limb:** The upper limb strength measurement is performed through the handgrip test. Systematic reviews show that this test, recommended and used worldwide, is the most appropriate way to measure the maximum strength of the upper limb in adolescents.

- **Lower limb:** The long jump without impulse test is still included in the different sets of indicators worldwide. Several studies show that neither the knowledge of the test nor muscle fatigue alter the reliability of the test, making it ideal for measuring lower limb strength in adolescents.

**Medición Cardiorespiratory fitness measurement:** Cardiorespiratory fitness is a strong indicator of metabolic, mental, and physical health in girls, boys, and young people. It shows the body's ability to continuously, rhythmically, and dynamically exercise large muscle groups. Its measurement is significantly associated with health, regardless of physical activity levels, and it is an important determinant of sports and athletic performance.

The most studied and performed test worldwide is the 20 meters running, both forward and backwards, and the running speed is controlled through a soundtrack, starting at a 8 km/h speed, to increase at a rate of 0.5 km/h per minute until the student becomes fatigued or when an audible signal is heard before reaching the final line for two consecutive lapses, indicating that the student could not keep that speed.



# The Process to Carry out the Study in Bogotá in 2022

The set of tests for the assessment of physical and psychological well-being of adolescents, suggested by the SaludHable IPS Experts Committee and approved by the Technical Committee (UNESCO, UNDP and IDEP), was selected after an exhaustive and extensive review of the bibliography and experiences both at national and international levels.

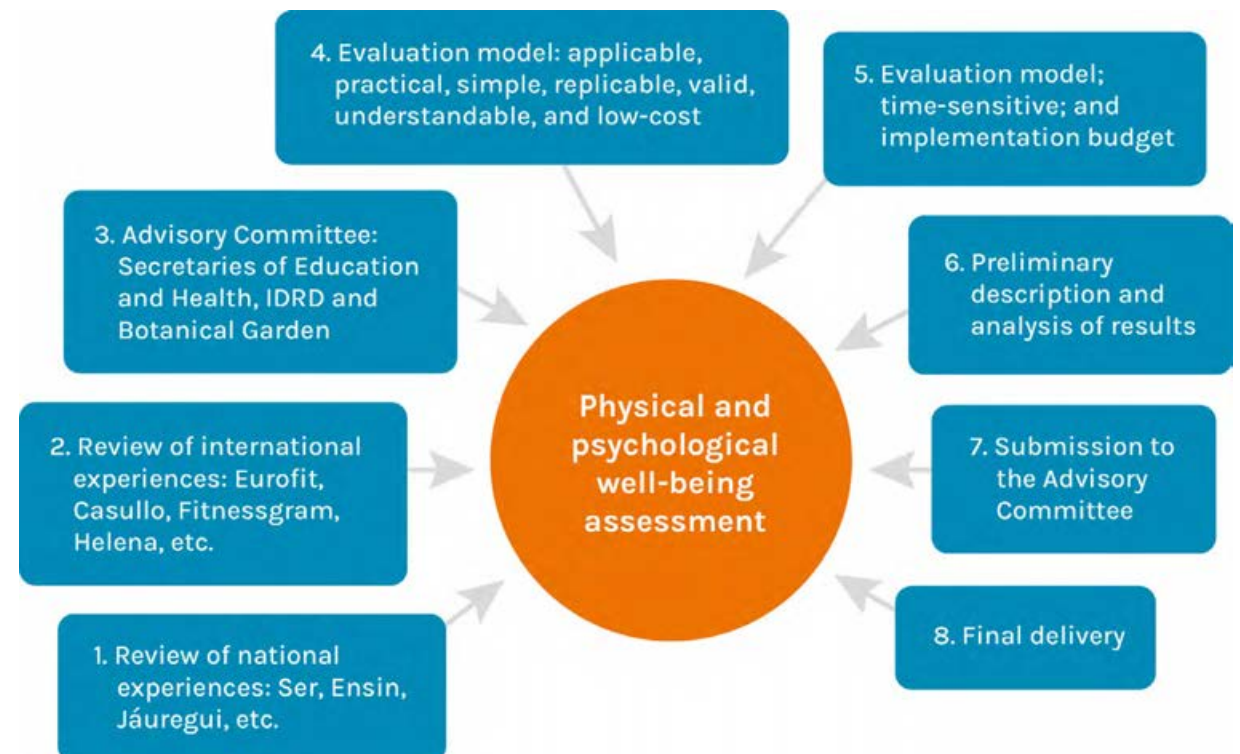
It was presented to the Advisory Committee to ensure that every test meet validity, reliability, feasibility, safety, and easy applicability criteria, and that anyone, disregarding their gender or physical condition, could participate in the tests.

The tests are easily repeatable tests that can be developed in a closed area or in the open field, requiring a maximum area of 25 x 25 meters, and allowing the simultaneous evaluation of several adolescents.

By applying them periodically to 9th grade students (at the end of secondary basic education), they constitute the ideal measurement of competence development in adolescence, as an intermediate stage between childhood and adulthood. They also enable systematic epidemiological surveillance at this stage of life and development, but they are not designed to detect sports talents.

Once the fieldwork is carried out, a description of the results analysis should be performed, and this should be discussed with the Advisory Committee consulted at the beginning.

Figure 3. Development of the Physical and Psychological Well-being Evaluation



## Working Method

This is shown in Figure 3.

## Human Talent

A multidisciplinary group of experts carried out the (technical, methodological, logistical, and institutional) design, implementation, analysis, and systematisation of the whole process. The group included Physical Education, Psychology, Nutrition, Pedagogy, Sports Medicine, Physiotherapy, Statistics and Communication professionals.

### Measurement Supplies

- Seca 874 DR® calibrated floor scales, with a 0.5 kg resolution.
- Seca 213® portable stadiometer (Hamburg, Germany), 0-220 cm range, 1 mm accuracy.
- Seca Measuring tape 201® inextensible anthropometric tape.
- Slimguide® adipometer or plicometer.
- Adjustable pressure dynamometer with up to 0.5 kg precision (Takei TTK 5101®, with adjustable grip, range 5-100 kg (Tokyo, Japan).)
- **Fitnessgram®** soundtrack (click on the name to hear it.)

### Development

IDEP and SDS focused the study, which was also of interest to the participating educational institutions.<sup>13</sup>

Initially a pre-pilot test was carried out with thirty students from the Saludcoop Norte district school, in Usaquén, and subsequently, a pilot study was applied to a sample of 303 students from the following educational institutions of the capital district (Table 1.)

The study had as a starting point the physical well-being tests<sup>14</sup> carried out within the framework of the *Ser* tests of Bogotá (2013-2015), with the addition of a psychological well-being component.<sup>15</sup>

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13. The focus in the town of Tunjuelito is based on the document (unpublished): *Caracterización de la Convivencia escolar en la localidad - Diagnóstico y acciones. July 2022*, by the District Secretary of Education.

14. **Physical well-being**, understood as the ability to perform various activities thanks to the proper functioning of the organs. One of the elements that develops and maintains physical well-being is voluntary muscle movement, known as *physical activity*.

Table 1. **Schools Participating in the Study**

Town	School	Sample	F	M	NB
Tunjuelito	Colegio Ciudad de Bogotá (IED)	29	13	14	2
	Colegio Marco Fidel Suárez (IED)	63	33	29	1
	Colegio INEM Santiago Pérez (IED)	117	55	61	1
	Colegio Venecia (IED)	49	27	22	0
Los Mártires	Colegio República Bolivariana de Venezuela (IED)	45	22	22	1

Table conventions: female (F), male (M) and non-binary (NB) genders. The sample is the total number of students per school.

### Logistics

The dynamics consisted in measuring groups of students, with an average age of 15 years old, in 2 to 4 hours sessions (depending on the size of the group: 60 or 120 students, respectively), in four (4) simultaneous modalities, each at a different measuring station, following the acceptance by and coordination with the schools' boards of directors, and the reading, understanding, and signing of consents and assents by mothers, fathers and students.

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15. **Psychological well-being** is based on the theoretical and methodological contributions of María Martina Casullo on the *psychological well-being of adolescents*, on the understanding that a person has a high level of well-being if he or she experiences satisfaction with his or her life, if his or her mood is often good and if he or she only occasionally experiences unpleasant emotions such as sadness or anger.



Afterwards, students are involved and explained why and how the assessments will be carried out. The group is then divided into four subgroups of approximately fifteen people, with a person designated to guide each group (and who will accompany the group throughout the evaluation day.).

A number is assigned to each station in order to guide the rotation of the groups, as shown in Figure 4. Students go over the different stations in the following order (**click** on the following **blue bold letters** to see the **methodology** of **each station**):

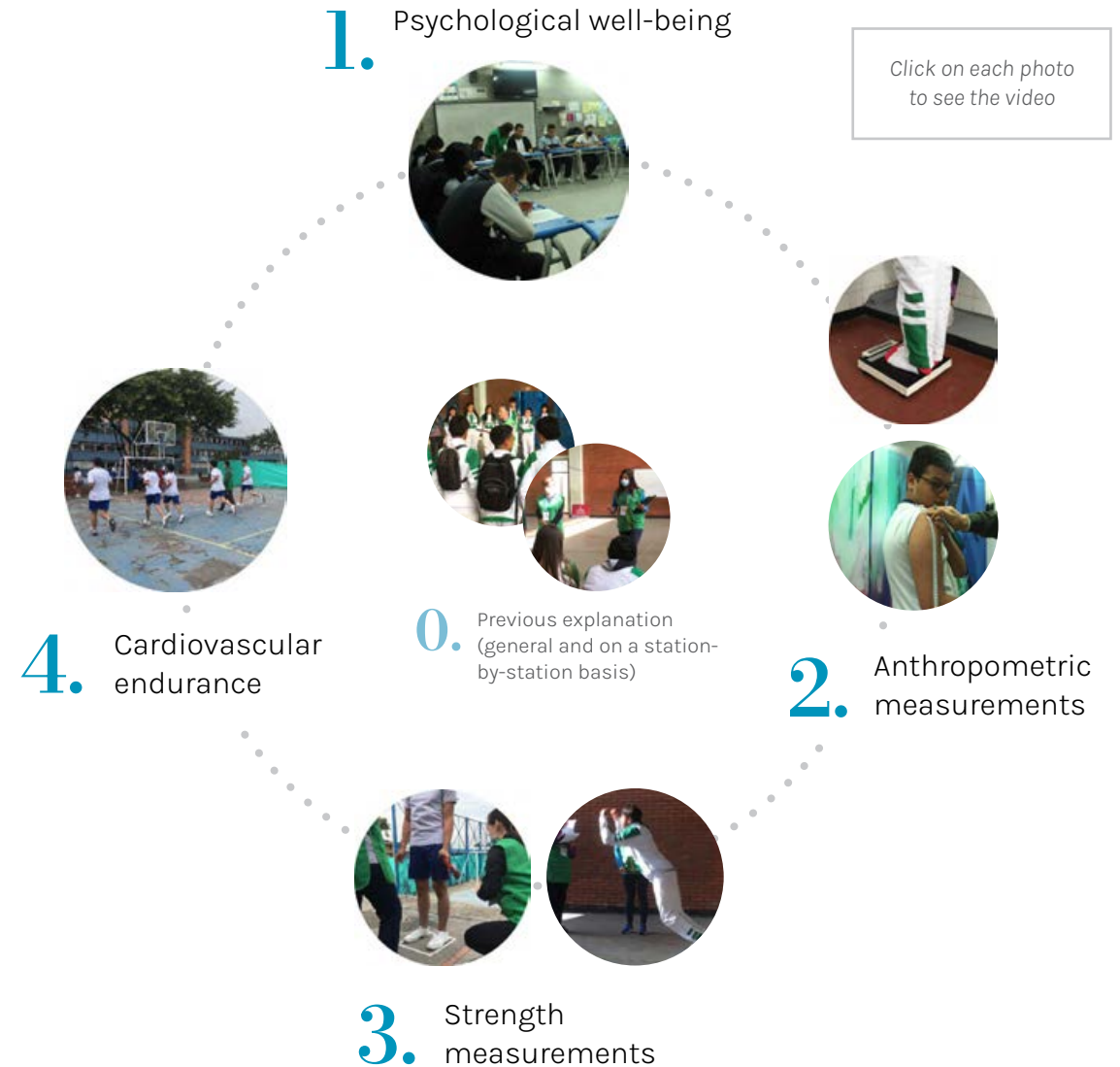
- **Station 1** is the measurement of **psychological well-being** (BIEPS-J scale.)
- **Station 2** are the so-called **anthropometric measurements** or *morphological component* (weight, height, abdominal perimeter, triceps fold, and arm perimeter.)
- **Station 3** are **strength measurements** (horizontal jump and handgrip by dynamometry.)
- **Station 4** is for measuring **cardiovascular or cardiorespiratory endurance** (20 meters forward and backwards running.)

The order of the stations aims at the strength measurements to precede the measurement of cardiovascular endurance. Or that if the subgroup reaches the cardiovascular endurance station first, it can rest for 60 minutes before getting to the strength measurements.

Every twenty-five (25) minutes, with a five (5)-minute walk, the group moves on to the next station, so the subgroups will cover the four stations in exactly two (2) hours.



Figure 4. **Order of the Used and Recommended Stations**



# Evaluación Phases

## Phase 1: Preparation

**First stage:** *Call and submission of the project to interested institutional deans and leaders.* Consists of:

1. A letter inviting the educational institution to participate in the evaluations.
2. Organization of a meeting with the boards, study heads or coordinators, and physical education teachers.
3. Presentation before school boards. Writing of minutes of the meeting with commitments of the binding entities.
4. Criteria for the inclusion of participating students (**Annex 1**.)
5. Setting of dates:
  - a. Submission of the list of students
  - b. Submission of consents/assents
  - c. Collection of consents/assents
  - d. Measurements' day
  - e. Results delivery day
6. Review of areas for carrying out the tests (four areas: a. room with desks, b. private room for taking body measurements, c. 10 x 10 meters area for strength station, and d. 25 x 25 meters area (for example, multiple-purpose field).)
7. Exchange of contact information between the school responsible/ manager and the evaluation group.

**Second stage:** *Institutional logistics organization.* Including:

1. List of 9<sup>th</sup> grade students (names, ID cards, gender.)
2. Submission of consent and assent through the school (**Annex 2**.)

3. Collection of consents and assents (request information about house location and socio-economic level; remember the confidential management of the data and only include the necessary information.)
4. Advance submission to the school of the schedule of related activities and activities to be carried out on the day of the evaluation.
5. Coordination and assurance of areas and places for the evaluations.
6. Submission of the list of evaluators and logistical support to the school for entry control.
7. If travel is required, a transportation company that ideally works for the institution or in the town, and specialises in the transport of schoolchildren, should be contacted. Once the service is agreed upon, policies should be requested from the transportation company and a letter should be sent through the school to the Local Education Board notifying the travel (**Annex 3**.)
8. It is also necessary to ensure that there are no problems of coexistence between students of the different schools that will be travelling.
9. Methodological distribution of sample collection stations (**Annex 4**.)
10. Selection of evaluation staff (**Annex 5**):
  - a. For the psychological well-being assessment station: A psychologist.
  - b. For the anthropometric measuring station: Two nutritionists or persons trained by the ISAK (International Society of Advanced Kinanthropometry.)
  - c. For strength measurements: Two people with a degree in Physical Education.



d. For the measurement of cardiovascular endurance: A person with a degree in Physical Education.

11. Selection of support staff: Considering the evaluation of 60 students every two hours, the following staff is suggested:
  - a. Four accompanying guides for each group (one person per group.)
  - b. One assistant for the psychological well-being station.
  - c. Two assistants for the anthropometric measurements station.
  - d. Two assistants for strength measurements.
  - e. Five assistants for the cardiovascular endurance station (Leger test.) Each one should monitor the carrying out of the test in three students.
12. Training and simulation of the sampling methodology.
13. Delivery of roles for each evaluator.
14. Validation of measurements.
15. Preparation of a *check list* of inputs for the evaluation of each station estación (**Annex 6.**)



### Phase 3: Data Processing and Analysis

**Fourth stage:** *Consolidation and analysis.* It requires:

1. Digitalisation of assessments' data in a database.
2. Digitalisation quality control: Double digitalisation or 10% sampling, which should have less than 10% of errors.
3. Database cleansing.
4. Variables generation/transformation.
5. Descriptive analysis of variables and comparison with previously obtained data (**Annex 11.**)



**Fifth and last stage:** *Systematisation of the experience.* As follows:

1. Contact meeting with the technical team, no later than at the end of the second stage, to prepare in advance a work plan that will be executed in time at the beginning of the third stage. Determination and pre-design of the systematisation products.
2. Video-photographic record of measurements in schools. This includes selection, handling, and editing of the images in the agreed formats (digital, printed, audiovisual, etc.).
3. Preparation of a report or document showing the contents of the systematisation in an appropriate and easy to read format, according to the audiences it is intended for.
4. Meetings for the development, adjustment and editing of a final text and the agreed graphic or documentary resources.
5. Final delivery of the products, in their formats and ready to be published or distributed.

### Phase 2: Fieldwork

**Third stage:** *Implementation of tests.* Considering:

1. Welcome readings (explanatory component) in general and on a station-by-station basis (**Annex 7.**)
2. Psychological well-being questionnaire (**Annex 8.**)
3. Data capture sheets model (**Annex 9.**)
4. Register in each station and evaluation session a logbook to detect/correct any bias or problem (**Annex 10.**)





Table 2. **Schedule**

Activity/Period in Weeks	Deadline	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32				
<b>PHASE I: PREPARATION</b>																																					
<b>First stage: Call and Planning</b>																																					
Investigation Committee Meetings																																					
Advisory Committee Meetings																																					
Systematisation Editing Committee																																					
Creation of an Administrative Logistics Support Group																																					
Meetings with local and sectional school boards																																					
<b>Second stage: Logistics Organization</b>																																					
Investigation Committee Meetings																																					
Creation of Evaluating Group																																					
Creation of a Field Logistics Support Group																																					
Training and simulation of physical tests																																					
Institution/evaluation logistics adjustments																																					
Compilation of schools' lists of students																																					
Assents and consents (submission/collection)																																					
<b>PHASE II: FIELDWORK</b>																																					
<b>Third stage: Implementation of Tests</b>																																					
Investigation Committee Meetings																																					
Institution/evaluation logistics adjustments																																					
Compilation of schools' lists of students																																					
Assents and consents (submission/collection)																																					
Enrolment: Check list																																					
Field evaluations																																					
Systematisation of the experience																																					
<b>PHASE III: DATA PROCESSING AND ANALYSIS</b>																																					
<b>Fourth stage: Consolidation and Analysis</b>																																					
Investigation Committee Meetings																																					
Advisory Committee Meetings																																					
Database digitalisation																																					
Database cleansing and adjustment																																					
Analysis of the data obtained																																					
Writing of results																																					
<b>Fifth stage: Delivery of Results</b>																																					
Systematisation of the experience																																					
Delivery of results and recommendations																																					

# Main Findings of the Study

The results and quantities presented in this report result from a measurement of the characteristics described in a convenience sampling in five (5) schools in Bogotá. Thus, *they do not come from a probabilistic sampling* and the results **cannot be generalised to the whole population of adolescents in the city.**

The pilot studies evaluate *the procedure, methodology, instruments, proposal of the presentation and use of the data*, which can show patterns and behaviours of the characteristics measured but **are not conclusive** due to what was mentioned above.

The following Table shows that in other Latin American countries, except Cuba, the adolescents in our study are below average.

Table 3. **Comparison of Our Pilot Study with Other Countries**

Population	No.	Age Group	Average	Standard Deviation
Argentina (Buenos Aires)	498	Adolescents 13-18	34.47	3.19
Argentina (Northwest)	453	Adolescents 13-18	34.20	3.69
Argentina (Patagonia)	319	Adolescents 13-18	34.23	3.17
Perú (Lima)	413	Adolescents 13-18	34.48	2.98
España (Valencia)	801	Adolescents 14-18	34.54	3.87
España (Basque Community)	401	Adolescents 14-18	34.23	2.89
Cuba (Havana)	334	Adolescents 11-16	31.65	3.09
<b>Our pilot study</b>	<b>296</b>	<b>Adolescents 13-17</b>	<b>32.81</b>	<b>4.06</b>

Source: Brenlla, M. E., Castro, A. and Cruz, S. (2002). Evaluación del bienestar psicológico en Iberoamérica. Buenos Aires: Paidós, p. 105.

## PSYCHOLOGICAL WELL-BEING

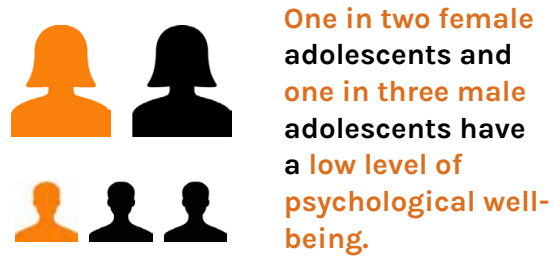
Differentiating by sex, the most affected dimensions were *self-acceptance* in female adolescents and *projects* in male adolescents.

On the contrary, the best-ranked dimensions were *control of situations* in female adolescents and *self-acceptance* in male adolescents.

Table 4. **Interpretation of the High and Low Scores of the BIEPS-J Scale**

Sub-scales	High Scores	Low Scores
<i>Control of situations</i>	He/she has a sense of control and self-competence. He/she can create or manipulate contexts to suit his/her own needs and interests.	He/she has difficulty handling daily life situations. He/she does not see the opportunities. Believes he/she is incapable of modifying the environment
<i>Self-acceptance</i>	Can accept his/her multiple aspects, including the good and the bad. He/she feels good about the past	Is disappointed about his/her past life. Would like to be different from how he/she is. Feels dissatisfied with himself/herself.
<i>Psychosocial bonds</i>	He/she is warm. He/she trusts other people. He/she can establish good bonds. He/she has empathy and affective capacity.	He/she has few relationships with other people. He/she isolates himself/herself. Feels frustrated about the bonds he/she establishes with other people. He/she cannot commit with them.
<i>Projects</i>	He/she has life goals and projects. He/she considers that life has a meaning. He/she has values that makes life meaningful.	He/she thinks that life lacks sense and meaning. He/she has few goals and projects. He/she cannot think that life has any purpose.

Figure 5. Main Findings of the Study: Psychological Well-being



The average qualification was **32.81 points**, which indicates that the group **is at a low level** (under the 25 percentile) of psychological well-being **in relation to data obtained in other adolescents in others countries** in which the average is highest (above 34, see **Table 3**).

If you want to reference the sample data of the present study in relation to previous studies such as the **enSin 2015 survey** at a national level and the **SER 2015 tests**, in Bogotá, click **here**.

Figure 6. Main Findings of the Study: Anthropometric Variables

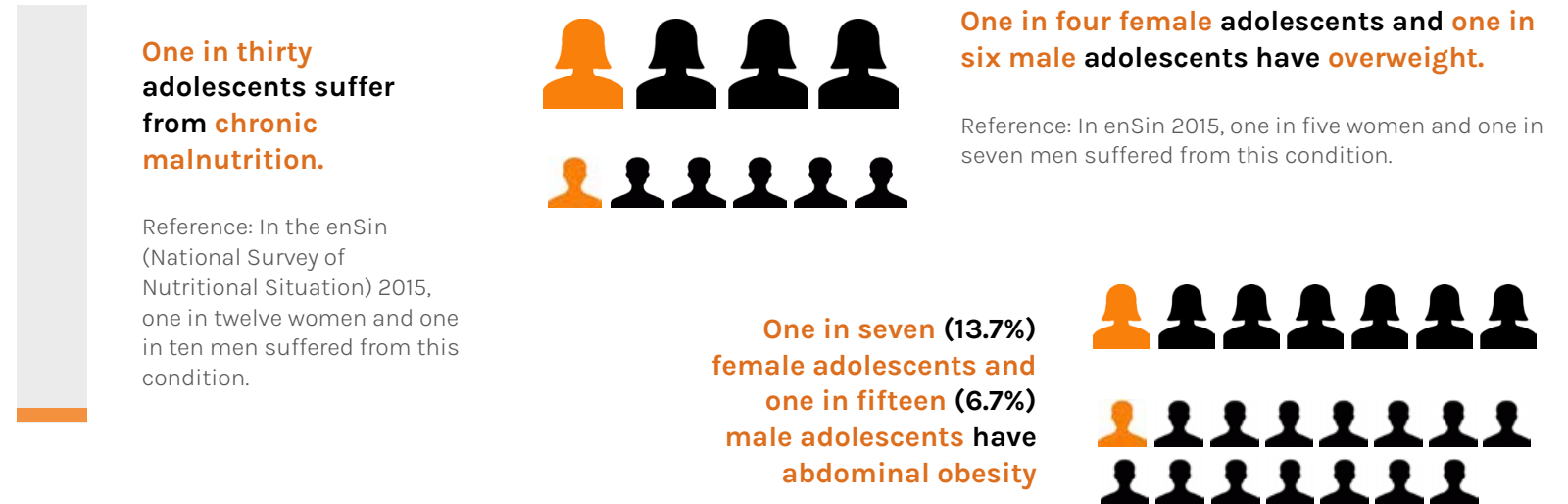


Figure 7. Main Findings of the Study: Maximum Strength



Figure 8. **Main Findings of the Study: Power Strength and Relative Strength**

**POWER STRENGTH**



**One in two female or male adolescents have a poor muscle condition of the lower limbs.**

When comparing with the maximum strength, the situation does not change for female adolescents and the health risk increases for male adolescents (based on the parameters of the Helena study.)

**RELATIVE STRENGTH = MUSCLE STRENGTH / WEIGHT (DISAGGREGATED BY SEX):**

**54.2% of female adolescents and 15.3% of male adolescents have a high metabolic risk.**

Considering these cut-off points compared to the Fuprecol study, carried out by Ramírez et al., which sought the association between relative strength (grip strength/weight) and metabolic health.



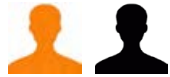
**One in two female adolescents and one in seven male adolescents are classified as having a high cardiometabolic risk due to poor muscle condition.**

Figure 9. **Main Findings of the Study: Cardiorespiratory Strength**

**CARDIORESPIRATORY CAPACITY (CARDIORESPIRATORY FITNESS)**



**One in three female adolescents and one in two male adolescents have an insufficient oxygen consumption value, which puts them at risk for cardiometabolic diseases.**



Based on the meta-analysis standard of Ruiz et al., 2015, which shows 35 ml/kg/min for female adolescents and 42 ml/kg/min for male adolescents.



Regarding Ser 2015 tests, **men are in the 25-50 percentile and women are in the upper percentile, 75-90.**

Regarding the international standard, **male adolescents are between the 10 and 20 percentiles and female adolescents are between the 50 and 60 percentiles.**

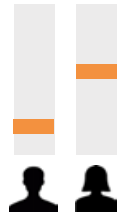


Figure 10. **Main Findings of the Study: Questionnaire on Physical Activity and Nature**

- The **means of transport** to the school which is **most used** by the students is **walk**, with **48.2%**.
- During **breaks**, the most frequent activity is **walking (54.1%)**. Only 14.5% report they **practice a sport**.
- **43%** of adolescents report engaging in **extra-curricular activities** that stimulate **physical activity**.
- **35%** of adolescents report doing **physical activity with their family**.



**That is, less than 50% of adolescents engage in physical activity outside of the physical education class**



**60%** of adolescents seek **contact with nature** and when they are in contact with nature, **92%** of them feel **relaxation and mental peace**.

**84%** of adolescents report that *they need* to have more contact with nature. This is corroborated when they are asked about the importance of this contact: **81%** considers it to be **important or very important**.

Table 5. **Main Findings of the Study: Non-binary Gender**

Measurement	Female			Male			Non-binary		
	Mean	SD	VR	Mean	SD	VR	Mean	SD	VR
Height in centimetres	157.28	5.69	3.6%	167.45	6.91	4.1%	158.33	7.64	4.8%
Weight in kilos	54.77	9.64	17.6%	56.46	9.71	17.2%	56.00	8.72	15.6%
MMI (muscle mass index)	22.11	3.38	15.3%	20.15	3.03	15.0%	22.33	4.04	18.1%
Abdominal circumference in cm	70.39	8.14	11.6%	71.14	7.74	10.9%	70.75	4.92	7.0%
Arm muscle area	3,589.96	1,190.54	33.2%	4,094.67	923.50	22.6%	3,636.50	798.13	21.9%
Arm fat area	1,717.81	720.14	41.9%	950.52	561.15	59.0%	2,127.25	1,175.74	55.3%
Dynamo measurement	23.00	4.91	21.3%	31.97	7.62	23.8%	22.00	8.00	36.4%
Relative maximum strength	0.23	0.42	182.1%	0.75	0.43	57.4%	0.33	0.58	173.2%
Muscle power	114.91	25.92	22.6%	163.29	31.17	19.1%	117.80	44.36	37.7%
Leger Runs	19.38	9.46	48.8%	42.53	18.91	44.5%	25.80	15.19	58.9%
Maximum VO2	32.11	3.91	12.2%	39.02	5.87	15.0%	33.80	5.45	16.1%
Maximum VO2 corrected for Bogotá	35.82	4.43	12.4%	43.41	6.46	14.9%	37.60	6.54	17.4%
Total BIEPS-J rating	32.01	3.49	10.9%	33.86	4.24	12.5%	29.40	4.28	14.6%
Total TBSCI-Y rating	35.15	7.03	20.0%	39.43	7.76	19.7%	32.00	6.40	20.0%

Source: Own elaboration with data from the study.

Within the framework of this study, we have considered it important to include a first analysis of dissident gender identities to guarantee and protect them, in relation to the framework of dichotomous categories of male or female, outside the predominant system of sex-gender, which is binary due to a cultural tradition.

**1.7%** (five adolescents) of the surveyed population were grouped into **non-binary** gender.

The variation ratio allows to see the intra-gender homogeneity (distribution with respect to the mean), and, since it is represented in percentage, it also allows the inter-gender comparison (Table 5).

Table 6. **BIEPS Value Disaggregated into Four Dimensions (Psychological Well-being of Non-binary Gender)**

High Dimension	Women	%	Men	%	Non- binary	%
ZAcceptance	23	16.5%	54	39.1%	1	20.0%
ZControl	44	31.7%	28	20.3%	1	20.0%
ZProjects	34	24.5%	26	18.8%	1	20.0%
ZRelationships	38	27.3%	27	19.6%	2	40.0%
<b>Total</b>	<b>139</b>	<b>100.0%</b>	<b>138</b>	<b>100.0%</b>	<b>5</b>	<b>100.0%</b>

Height, weight, body mass index, abdominal circumference, muscle area, maximum oxygen consumption and BIEPS-J score had a low variation ratio, which allows to conclude that the mean of these characteristics reflects the group. The other variables are heterogeneous and do not allow to characterise the group. If we relate the homogeneous physical variables mentioned above to the binary genders, they tend to approach the female values. It is noticeable that the value of BIEPS-J is lower than the binary genders.<sup>16</sup>

When the BIEPS-J value is disaggregated in the four dimensions (Table 6), the dimension with the best Z score among female adolescents was “control”, among male adolescents was “self-acceptance,” and among non-binary adolescents was “bonds.” On the contrary, the lowest score (low score) among female adolescents was “self-acceptance”, among male adolescents was “projects,” and among non-binary adolescents there was no differentiation between the other dimensions, given the small size of the sample.

16. Other researches, such as Gonzales and Deal, show worse outcomes in health indicators for gender-dissident individuals compared to cisgender controls: <https://jamanetwork.com/journals/jama/fullarticle/2791237>.

# Recommendations

## 1. The recognition of the body and its relationship with the physical and psychological well-being should be part of the evaluation of the comprehensive training of every student.

- a. The tools and methodologies for its evaluation included in this document allow to monitor the minimum values that guarantee a harmonious and healthy corporal and psychological development.
- b. The merging of the components of physical and psychological well-being at the same time highlights their complementarity and symbiotic interrelation.
- c. The chosen measurement tools make their application feasible from an institutional level to a city or country scale.

## 2. The evaluation or measurement should be carried out periodically. Regular evaluations allow not only to monitor but also to formulate interventions and to correct and adjust policies that look after the health of adolescents and future adults.

## 3. We must strive for an integration between knowledge and being, for a more comprehensive training, and for a more complete educational culture, and this is expressed when both dimensions (knowledge and being) are measured on a regular and articulated basis.

## 4. Respect, inclusion, participation, and guidance of students.

- a. Each student is the centre: Not only they will have to provide their authorization to take the test and their comfort will be guaranteed during the test, but the results should be explained to them, and they should be motivated and recognised *whatever* their results may be.
- b. Data belong to each student; they are private.
- c. All students should participate. There will be those who can perform all the tests and those who, due to limitations or will, will only perform part of them.

## 5. Data quality and methodological accuracy.

- a. It is critical to choose instruments and keep them calibrated to achieve a good sensitivity for obtaining each data.
- b. Once the evaluation processes have been developed at each station, it is important to test them and evaluate their replicability, accuracy and execution times before starting mass evaluations.
- c. It is key to select the right staff, not only from an academic point of view, but also regarding their human abilities. Experienced staff reduces biases during the evaluation. Support staff should know, test, and understand the processes to collaborate properly.
- d. Methodological accuracy: Omitting or skipping steps is not allowed. It is possible to adjust to unexpected situations (which may regularly arise), without sacrificing the methodological accuracy of the evaluation.
- e. Custody of the result: Data are only of interest to the evaluated person, the evaluating person, and the research team. It is mandatory to be careful in the transmission of any data. Station heads and researchers are responsible for monitoring the records and guarding them in schools and outside.
- f. Continuous review of data, variables, and calculations. After having been registered on paper and typed, data should be reviewed to reduce transcription errors. Once data have been organised and worked on, they should be continuously reviewed. Once the results have been analysed and written, they should be questioned and reviewed.

## 6. Teamwork (interdisciplinary). The inclusion of the psychological well-being component is an important contribution to the study and the measurement of adolescents' well-being. This component cannot be put off, as it is evidenced by the





existence of numerous scientific studies on psychological well-being in particular and on adolescents' mental health in general, which have been carried out from a psychological perspective. Most of the world's large adolescents' well-being indexes do not document this aspect, and the few that do, reduce it entirely to the larger overall health set.

**7. Measuring physical activity and exercise, cardiorespiratory fitness and strength gives a closer insight into the physiological reality of people.** This measurement should be preferred to the measurement of physical activity through questionnaires, which, despite being much cheaper, has not shown to have the required precision and specificity.

**8. We recommend not using the fitness assessment to grade students.** This assessment should focus on improving health and preventing the development of chronic diseases.

**9. Do not use the fitness assessment to evaluate the physical education class.** Said class should not only work on physical fitness, but it should also consider motor skills, social skills, and health maintenance tools. The responsibility of physical activity lies not only on the physical education teachers, but on all the teachers; mothers, fathers, caregivers and/or assistants; school board, and health staff, among others.

**10. Policies to promote physical activity are not only related to the education, health, recreation, or sports sectors,** they involve other sectors as well, such as: transport, urban planning, security, and citizens' coexistence.

**11. Promoting behaviours that generate health and well-being is a fundamental mission of any educational institution.** These institutions should provide knowledge, facilities, and skills for young people to have healthy habits. Physical activity and psychological well-being help adolescents get fit, feel good, and perform better in school, while reducing risks such as drug use and crime.

**12. Schools should reformulate the Institutional Educational Project to include physical activity and health promotion,** emotions' management, emotional intelligence, proper nutrition, and other issues in a cross-curricular way (classes of all subjects, special days, etc.) and extracurricular activities. The formation of an alliance or coalition with agents that do not belong to the educational institution will provide more possibilities to develop different types of physical activities outside the institution: recreational vacations, ecological outings, etc.

**13. It is recommended to continue considering the non-binary gender and the results of its evaluations** to establish within future studies a baseline that allows measuring and analysing the behaviour of both physical and psychological variables.

# Opportunities

- 1. Having the participation of government entities** such as the Secretaries of Education and Health, the Recreation and Sports Institute, and the Botanical Garden of Bogotá, as well as IDEP and international organizations, such as UNESCO and UNDP, has allowed the **awareness of their representatives** regarding the subject. **It is expected that at least these seven entities will continue a process** and continue developing this type of evaluations and the potential interventions that may arise from here.
- 2. Measuring and knowing the state of physical and psychological well-being of the adolescent students' population**, being able to carry out **interventions** and again measuring to evaluate said interventions, and, finally, being able to improve the health and future of that population.
- 3. Having permanent comparability** (if the study is carried out, for example, on an annual basis) with international standards and being able to promote strategies that have been effective in other countries to improve physical and psychological condition and, therefore, have a healthy impact on the mental health of adolescents.
- 4. Any public or private entity can perform physical and psychological well-being assessments with a set of valid, reliable, viable, low-cost, and safe tests.** Additionally, all tests included in this set are related with some aspect of the present or future health of children and adolescents.
- 5. Motivating colleagues to conduct longitudinal studies** in adolescents to establish **standard health criteria** for the different fitness tests proposed in this set.
- 6. Talking with adolescents about health aspects and healthcare.** Encourage them to obtain results regarding their physical and psychological well-being through cardiovascular and muscular skills.
- 7. Including the topic in the curricula and educational projects** of the institutions, to the extent that the set of tests of physical and psychological well-being are applied periodically and are constantly mentioned.
- 8. That adolescents feel valued, considered, and sustained** to be able to develop positive expectations about themselves and what they can achieve in their lives.
- 9. Building and creating conditions** for adolescents to **develop their full potential.**
- 10. Forging a better present and a better future.**
- 11. Lowering country costs** by having a society composed of healthier people with a better well-being.
- 12. Creating or efficiently transforming policies** related to the well-being of the adolescent population by having solid data.
- 13. Continuously monitoring public policies** for the well-being of the adolescent population: Identifying new challenges that foster the design of coherent actions and the creation of opportunities to improve their quality of life.





# Contact and Acknowledgements

## TECHNICAL COMMITTEE

Educational Research and Pedagogical Development Institute (IDEP)

United Nations Educational, Scientific and Cultural Organization (UNESCO)  
montevideo@unesco.org

United Nations Development Programme (UNDP Colombia)

SaludHable IPS  
hablemos@saludhable.com.co

## ADVISORY COMMITTEE

District Secretary of Education (SED)

District Secretary of Health (SDS)

District Recreation and Sports Institute (IDRD)

Bogotá Botanical Garden (JBB)

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Local Director of Education of Tunjuelito  
Isabel Astiasuainzarra Gaitan

Colegio República Bolivariana de Venezuela (IED)  
Dean: Hugo Florido

Colegio INEM Santiago Pérez (IED)  
Dean: Hugo Arturo Rodríguez Bautista

Colegio Ciudad de Bogotá (IED)  
Dean: Jorge Ovalle

Colegio Marco Fidel Suárez (IED)  
Dean: Miguel Gómez

Colegio Venecia (IED)  
School counsellor: Yenny Marín

Colegio Saludcoop Norte (IED)  
Dean (E): Martha Patricia Ramírez

## PRODUCTION

### Systematisation Editing Committee

Andrés Morales Arciniegas, Eduardo Vásquez Torres, Julio César Guanche, Nicolás Reyes, Lucía Costa Piñeiro, Andrés Felipe Cárdenas, Diana Rojas, Jaime Orlando Buitrago González, Alexis Asprilla, Gustavo Tovar, Javier Gutiérrez, Óscar Sánchez Jaramillo, Felipe Alejandro Riveros C.

### Research Committee (SaludHable)

Gustavo Tovar, Javier Gutiérrez, Karina Claudia Bothert Ortiz, Martha Elena Fajardo Sandoval, María Cristina Ospina Medina

### Design, Editing, Photographs and Videos

Felipe Alejandro Riveros Cendales  
Chigüiro Estudio

Bogotá, 2022

