

## Protocolo

## SESSAMO, follow-up of secondary students to assess mental health and obesity: a cohort study



Adriana Goñi-Sarriés<sup>a,b</sup>, Guillermo Pérez<sup>c</sup>, Nora Yáñez-Goñi<sup>d</sup>, Francisca Lahortiga-Ramos<sup>b,e</sup>, Álvaro Iruin<sup>f,g</sup>, Azucena Díez-Suárez<sup>b,h</sup>, Iñaki Zorrilla<sup>i</sup>, Leticia Morata-Sampaio<sup>j</sup>, M. Jesús Oliver<sup>k</sup>, Ana González-Pinto<sup>i</sup>, Almudena Sánchez-Villegas<sup>b,l,m,\*</sup>

<sup>a</sup> Red de Salud Mental de Navarra, Servicio Navarro de Salud-Osasunbidea, Pamplona, Spain

<sup>b</sup> Instituto de Investigación Sanitaria de Navarra, Pamplona, Spain

<sup>c</sup> Servicio de Psiquiatría, Complejo Hospitalario Universitario Insular-Materno Infantil, Servicio Canario de la Salud, Las Palmas de Gran Canaria, Spain

<sup>d</sup> Servicio de Psiquiatría, Hospital Clínico Universitario Lozano Blesa, Servicio Aragonés de Salud, Zaragoza, Spain

<sup>e</sup> Departamento de Psiquiatría y Psicología Médica, Universidad de Navarra, Pamplona, Spain

<sup>f</sup> Biodonostia Health Research Institute, Donostia-San Sebastián, Spain

<sup>g</sup> Red de Salud Mental de Gipuzkoa, Osakidetza, Spain

<sup>h</sup> Unidad de Psiquiatría Infantil y Adolescente, Departamento de Psiquiatría y Psicología Médica, Clínica Universidad de Navarra, Pamplona, Spain

<sup>i</sup> OSI Araba, Osakidetza, Vitoria-Gasteiz, Spain

<sup>j</sup> Departamento de Psicología y Sociología, Universidad de Las Palmas de Gran Canaria, Las Palmas de Gran Canaria, Spain

<sup>k</sup> Research Institute of Biomedical and Health Sciences, Universidad de Las Palmas de Gran Canaria, Las Palmas de Gran Canaria, Spain

<sup>l</sup> Centro de Investigación Biomédica en Red de la Fisiopatología de la Obesidad y Nutrición (CIBEROBN), Spain

<sup>m</sup> Institute for Innovation & Sustainable Development in Food Chain, Universidad Pública de Navarra, Pamplona, Spain

## ARTICLE INFO

## Article history:

Received 20 June 2023

Accepted 1 February 2024

## Keywords:

Adolescents

Lifestyles

Mental health

Screening

Cohort

## ABSTRACT

During last decades, a departure from health-related lifestyles has been observed among adolescents. Evidence reports that healthy lifestyles could be predictors of better mental health status. The aims of the SESSAMO Project are: 1) to assess the association between lifestyles and physical and mental health; 2) to assess how self-concept and stressful life events can modulate these associations; and 3) to establish the role of social determinants in the lifestyle and in adolescents' health. The SESSAMO Project is a prospective cohort carried out in Spain. Students aged 14–16 years (2nd–4th ESO) and their parents are invited to participate. Baseline data are collected through on-line, validated, self-administered questionnaires through a digital platform. Information on lifestyles, stressful life events and self-concept are collected. Screening of depression, anxiety, eating disorders, suicide risk, psychotic experiences and COVID impact is assessed. Every three years, up to age of 25, participants will be contacted again to update relevant information.

© 2024 SESPAS. Published by Elsevier España, S.L.U. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

## SESSAMO, seguimiento de estudiantes de secundaria para valorar salud mental y obesidad: estudio de cohortes

## RESUMEN

En las últimas décadas se ha producido un alejamiento de los estilos de vida saludables en adolescentes. Los hábitos saludables pueden predecir una mejor salud mental. El proyecto SESSAMO tiene como objetivos: 1) determinar la asociación entre el estilo de vida y la salud física y mental; 2) determinar cómo el autoconcepto y los acontecimientos vitales estresantes pueden modular dichas asociaciones; y 3) establecer el papel de los determinantes sociales en el estilo de vida y en la salud de los adolescentes. Se trata de un estudio de cohortes prospectivo, dirigido a estudiantes de secundaria de 14–16 años y a sus padres. Los datos basales se recogen con cuestionarios validados y autoadministrados en una plataforma *on-line*. Se realiza un cribado de depresión, ansiedad, trastornos alimentarios, riesgo de suicidio, experiencias psicóticas e impacto de la COVID-19. Cada 3 años, hasta la edad de 25 años, se les volverá a contactar para actualizar la información relevante.

© 2024 SESPAS. Publicado por Elsevier España, S.L.U. Este es un artículo Open Access bajo la licencia CC BY-NC-ND (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

## Palabras clave:

Adolescentes

Estilos de vida

Salud mental

Cribado

Cohorte

## Introduction

Adolescence is a transition period characterized by changes in physical, cognitive, emotional, and social features making this period a crucial and critical stage in adolescents' development.

\* Corresponding author.

E-mail address: [almudena.sanchez@unavarra.es](mailto:almudena.sanchez@unavarra.es) (A. Sánchez-Villegas).

✉ [@ProyectoSessamo](https://twitter.com/ProyectoSessamo) (A. Sánchez-Villegas)

At this stage, behavior and lifestyles development patterns might affect the future health and well-being of youths. In recent decades healthy lifestyles in this age period have been abandoned. Moreover, much evidence has been established reporting that these healthy lifestyles could be strong predictors of better mental health status among adolescents.<sup>1</sup>

Spain tops the ranking of childhood obesity prevalence in the European Union. Childhood obesity is closely related to free time exposure to screens.<sup>2</sup> A consistent association between sedentarism or screens use and poor mental health has been observed.<sup>3</sup> This fact is important when one third of our adolescents spends more than 3 hours per day connected to social networks.<sup>4</sup> Excessive use of social networks or watching television, insufficient physical activity level or inadequate sleeping patterns are considered risk factors for psychopathology development.<sup>5</sup> Concerning toxic consumption, according to the ESTUDES Survey (*Spanish National survey on drug use in Secondary Education*), more than 50% of adolescents aged 14-18 years report binge drinking in the last 12 months and one in every four-last month. Several studies have demonstrated that the use of cannabis during adolescence increases the risk of psychosis and schizophrenia accompanied by genetic factors, among others.<sup>6</sup> On the other hand, adverse life events during childhood, especially adult abuse and bullying by peers<sup>7</sup> are important predictors of impaired social development and mental disorder.<sup>8</sup>

In Spain, suicide is the first cause of death between 15 and 24 years.<sup>9</sup> Non-suicidal self-harm, beginning between 11-15 years of age and present in 13-23% of the general population, is an indicator of emotional dysregulation and an important risk factor for suicide attempts.<sup>10</sup>

In Spain, no cohort studies have been carried out in the adolescent population with the objective to ascertain the relationship between lifestyles and psychosocial factors and risk of physical illnesses and mental disorders. Given the priority to carry out specific preventive efforts and public health policies in this crucial transition period, it is essential to describe the prevalence of healthy and risk behaviors, as well as psychiatric symptoms, and to establish possible associations between the prevalence of these behaviors and the risk of developing physical and mental disorders. This is the main objective of the SESSAMO cohort study. This project aims to: 1) assess the association between lifestyle and physical and mental health; 2) assess to in which extent self-concept and stressful life events can modulate these associations; and 3) establish the role of social determinants both in the lifestyle and in adolescents' health.

## Method

### Design

SESSAMO Project (*Seguimiento de Estudiantes de Secundaria para valorar Salud Mental y Obesidad* [Follow-up of secondary students to assess mental health and obesity]) is a multicentric prospective cohort study developed in Spain. The collection of baseline data of the participants is carried out at schools through on-line, validated, self-administered questionnaires included in a data collection platform specifically designed for this project. Starting at 14, every three years, up to the age of 25, participants will be contacted again through a mobile application to update their information. The follow-up questionnaires will include questions regarding habits and changes in lifestyle and psychosocial or physical variables, and new medical or psychiatric diagnoses.

### Participants

All public, concerted and private upper schools from Canary Islands, Navarre and the Basque Country participate in the study. After schools' acceptance to participate, all the students aged from 14 to 16 years (from 2nd to 4th of ESO - grades 2 through 4) and their parents or legal guardians are invited to take part of the study. We estimate a final sample of 4000 participants. Exclusion criteria are: the non-participation of the school center, poor knowledge of the two languages in which the study is developed: Spanish or Basque language; the non-participation acceptance by parents or legal guardians; the non-participation assent by the student despite the consent of the parents or guardians; and students with cognitive or visual impairment.

### Tools and materials for data collection

Baseline information is collected through on-line, validated, self-administered questionnaires included in a data collection platform specifically designed for this project (Table 1). Variables related to lifestyles, stressful events, personality and mental health are collected. The Oviedo Response Infrequency Scale<sup>11</sup> is included to detect random responses.

After parents or legal guardians fulfill the informed consents, adolescent' height and weight are measured. Likewise, by means of another specific informed consent, the technician collects an oral sample obtained rubbing a specific collector for genetic determinations (ORACollet DNA OCR-100 Kit), non-invasive technique and without health risk. These samples are kept in a biobank until analysis and will be destroyed once the project has finished.

SESSAMO includes an optical questionnaire for parents inquiring about several physical and mental diseases and health conditions of their children. COVID-19 impact is included. This questionnaire is completed in paper format and only at baseline.

### Statistical analyses

The association between lifestyle variables and the presence of stressful life events and the prevalence or incidence of physical and mental pathology will be carried out through logistic regression models. Cox regression models will be used for longitudinal analysis with more than 2 years of follow-up. Likewise, in the case that the different mental health indicators are collected quantitatively generalized linear models or generalized estimation equation models will be applied. In all cases, the models will be adjusted for possible confounding variables. The possible interaction between personality traits or the presence of stressful events and different lifestyles in their effect on mental health will be analyzed including interaction terms in the regression models.

### Confidentiality and ethical aspects

The Research Ethics Committees at each Spanish autonomous community implicated in the project approved the protocol. All participants and their parents or legal guardians receive a study information sheet and a graphical summary of the protocol (see online Appendix A), as well as individual informed consents. Together with the consent of the parents/legal guardians, the assent of the minor is included.

Data storage is carried out in two independent databases. One of them contains participants' identification data and the other clinical conditions. The use of independent databases guarantees the confidentiality of the data.

All information is treated in a completely confidential manner and is used exclusively for research purposes, according to the

**Table 1**  
Baseline assessment: questionnaires included in the digital platform.

| Variables                      | Instruments of measurement  |
|--------------------------------|---|
| <i>Lifestyle and health</i>    |   |
| Diet                           | Food Frequency Questionnaire (FFQ) <sup>12</sup>                      |
| Physical activity              | Physical Activity Questionnaire for Adolescents (PAQ-A) <sup>13</sup> |
| Hobbies                        | Questions from ESTUDES <sup>14</sup>                                  |
| Toxic habits                   | Questions from ESTUDES <sup>14</sup>                                  |
| Sleep quality                  | Pittsburgh Sleep Quality Index (PSQI) <sup>15</sup>                   |
| Sexual behavior                | Questions from the 2019 Middle School Youth Risk Behavior Survey      |
| Videogames                     | Game Addiction Scale for Adolescents (GASA-Short) <sup>16</sup>       |
| Internet problematic use       | Problematic Internet Use Scale in adolescents (PIUS-a) <sup>17</sup>  |
| <i>Stressful events</i>        |   |
| Bullying and cyberbullying     | Olweus Bully Victim Questionnaire (OBVQ) <sup>18</sup>                |
| Stressful life events          | Stressful Life Events Inventory <sup>19</sup>                         |
| Adverse experiences            | Inventory of Adverse Childhood Experiences (IACE) <sup>20</sup>       |
| <i>Personality variables</i>   |   |
| Self-concept                   | Self-concept Form 5 (AF-5) <sup>21</sup>                              |
| <i>Mental health</i>           |   |
| Strengths and Difficulties     | Strengths and Difficulties Questionnaire (SDQ) <sup>22</sup>          |
| Depression, Anxiety and Stress | Depression, Anxiety and Stress Scale (DASS-21) <sup>23</sup>          |
| Suicide risk                   | Columbia-Suicide Severity Rating Scale (C-SSRS) <sup>24</sup>         |
| Self-Injurious                 | Self-Injurious Thoughts and Behaviors Interview (SITBI) <sup>25</sup> |
| Eating disorder                | Children's Eating Attitudes Test (ChEAT) <sup>26</sup>                |
| Psychotic experiences          | Prodromal Questionnaire-Brief (PQ-B) <sup>27</sup>                    |
| COVID-19 impact                | UCLA Brief COVID-19 Screen for Child/Adolescent PTSD <sup>28</sup>    |

Spanish Organic Law 15/1999 on data protection and Law 3/2018 on data protection and guarantee of digital rights (LOPD).

## Discussion

SESSAMO Project is the first Spanish study whose aim is to prospectively assess the association between lifestyle and social determinants with physical and mental health in adolescents. Data from SESSAMO will permit to ascertain adolescents' lifestyle and the main health problems associated to them. To establish the role that these lifestyles have on adolescents' health is essential to design and implement preventive actions to change these habits and improve first adolescents' and later adults' physical and mental health.

Due to the importance of early intervention in the development of possible psychopathologies, the research team informs the parents or guardians if a suspicious case of mental disorder is detected. Finally, each participating school receives a global results report. This information will make it easier for schools to develop lines of action and implementation of specific programs that address issues such as emotional management, suicidal ideation, mental health, and lifestyles, among others. The participation of different Spanish regions and types of schools increases study power and its ability to extrapolate its results.

## Limitations

Although the adolescents will be accompanied by a technician during the baseline evaluation who can resolve their doubts and all the questionnaires used to early detection of mental disorders have been validated in adolescent samples a non-differential misclassification bias cannot be ruled out. In order to avoid a possible bias in answering questionnaires, as quality control analysis, a specific scale has been introduced in the platform to eliminate those participants who report random responses.

Another limitation is that the platform is not accessible to students with visual disabilities.

An important challenge of this study is, firstly, to get the involvement of schools, and secondly family's participation. For that reason, our team is involved in all the process starting with the first

approach to school authorities and counseling departments, and finally getting access to parents' associations and families providing all the information they request.

## Related articles

No other publications containing the results of this study have already been published or submitted to any journal.

## Study status

At the time of this submission participant recruitment was not completed.

## Editor in charge

Salvador Peiró.

## Authorship contributions

A. Sánchez-Villegas and A. Goñi-Sarriés performed the literature review and conceived and designed the study. G. Pérez, N. Yáñez-Goñi, F. Lahortiga-Ramos, A. Iruin, A. Díez-Suárez, I. Zorrilla, L. Morata-Sampaio, M.J. Oliver and A. González-Pinto designed the data collection tools and will conduct the recruitment and the evaluation of the subjects in the different Spanish regions. A. Sánchez-Villegas and A. Goñi-Sarriés drafted the manuscript. A. Sánchez-Villegas will manage data. All authors have reviewed the manuscript and approved the final version of the protocol.

## Acknowledgements

The authors wish to thank all adolescents, their families, teachers and management teams from educational centers involved in the SESSAMO Project.

## Funding

This study has been funded by the Spanish Ministry of Science and Innovation (Spanish National Institute of Health, European

Regional Development Fund) and the Instituto de Salud Carlos III, PI20/00133.

### Conflicts of interest

A. Sánchez-Villegas: Instituto de Salud Carlos III, Grant PI20/00133. I. Zorrilla: Otsuka and Janssen conference support. A. González-Pinto: Grants of Cibersam, Spanish Ministry of Science and Basque Government; provided funding, consulting fees and conference support of Janssen, Angelini and Rovi.

### Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at doi:10.1016/j.gaceta.2024.102385.

### References

- Zhang J, Yang SX, Wang L, et al. The influence of sedentary behaviour on mental health among children and adolescents: a systematic review and meta-analysis of longitudinal studies. *J Affect Disord.* 2022;306:90–114.
- Cartanyà-Hueso A, Lidón-Moyano C, Cassanello P, et al. Smartphone and tablet usage during covid-19 pandemic confinement in children under 48 months in barcelona (Spain). *Healthcare (Basel).* 2021;9:96.
- Santos RMS, Mendes CG, Sen Bressani GY, et al. The associations between screen time and mental health in adolescents: a systematic review. *BMC Psychol.* 2023;11:1–21.
- Scott H, Biello SM, Woods HC. Social media use and adolescent sleep patterns: cross-sectional findings from the UK millennium cohort study. *BMJ Open.* 2019;9:e031161.
- Biddle SJH, Asare M. Physical activity and mental health in children and adolescents: a review of reviews. *Br J Sports Med.* 2011;45:886–95.
- Kiburi SK, Molebatsi K, Ntlantsana V, et al. Cannabis use in adolescence and risk of psychosis: are there factors that moderate this relationship? A systematic review and meta-analysis. *Substance Abuse.* 2021;42:527–42.
- Sweeting JA, Garfin DR, Holman EA, et al. Associations between exposure to childhood bullying and abuse and adulthood outcomes in a representative national U.S. sample. *Child Abuse Neglect.* 2020;101:104048.
- McKay MT, Cannon M, Chambers D, et al. Childhood trauma and adult mental disorder: a systematic review and meta-analysis of longitudinal cohort studies. *Acta Psychiatr Scand.* 2021;143:189–205.
- Instituto Nacional de Estadística. Defunciones según la causa de muerte. Ministerio de Asuntos Económicos y Transformación Digital. Madrid: Gobierno de España; 2021. Available at: <https://www.ine.es/jaxiT3/Tabla.htm?t=7947>.
- Castellví P, Lucas-Romero E, Miranda-Mendizábal A, et al. Longitudinal association between self-injurious thoughts and behaviors and suicidal behavior in adolescents and young adults: a systematic review with meta-analysis. *J Affect Disord.* 2017;215:37–48.
- Fonseca-Pedrero E, Paino M, Lemos-Giráldez S, et al. Construction and validation of the Oviedo Infrequency Scale in Spanish adolescents. Doctoral dissertation, Universidad de Oviedo, Spain; 2008.
- Vioque J, Garcia-de-la-Hera M, Gonzalez-Palacios S, et al. Reproducibility and Validity of a Short Food. *Nutrients.* 2019;11:933.
- Martínez-Gómez D, Martínez-de-Haro V, Pozo T, et al. Reliability and validity of the PAQ-A Questionnaire to assess physical activity in Spanish adolescents. *Rev Esp Salud Pública.* 2009;83:427–39.
- ESTUDES. Encuesta sobre uso de drogas en enseñanzas secundarias en España (ESTUDES), 1994-2021. 2021. Available at: [https://pnsd.sanidad.gob.es/profesionales/sistemasinformacion/sistemainformacion/pdf/ESTUDES-2021\\_Informe\\_de\\_Resultados.pdf](https://pnsd.sanidad.gob.es/profesionales/sistemasinformacion/sistemainformacion/pdf/ESTUDES-2021_Informe_de_Resultados.pdf).
- De la Vega R, Tomé-Pires C, Solé E, et al. The Pittsburgh sleep quality index: validity and factor structure in young people. *Psychol Assess.* 2015;27:e22–7.
- Lloret Irlés D, Morell Gomis R, Marzo Campos JC, et al. Spanish validation of Game Addiction Scale for Adolescents (GASA). *Atencion Primaria.* 2018;50:350–8.
- Rial Boubeta A, Gómez Salgado P, Isorna Folgar M, et al. EUPI-a: Escala de Uso Problemático de Internet en adolescentes. Desarrollo y validación psicométrica. *Adicciones.* 2015;27:47–63.
- Babarro I, Andiarena A, Fano E, et al. Risk and protective factors for bullying at 11 years of age in a Spanish birth cohort study. *Int J Environ Res Public Health.* 2020;17:4428.
- Oliva Delgado A, Jiménez Morago JM, Parra Jiménez A, et al. Acontecimientos vitales estresantes, resiliencia y ajuste adolescente. *Revista de Psicopatología y Psicología Clínica.* 2008;13:53–62.
- Finkelhor D, Shattuck A, Turner H, et al. A revised inventory of Adverse Childhood Experiences. *Child Abuse Neglect.* 2015;48:13–21.
- García JF, Musitu G, Riquelme E, et al. A confirmatory factor analysis of the "Auto-concepto Forma 5" questionnaire in young adults from Spain and Chile. *Span J Psychol.* 2011;14:648–58.
- Gaete J, Montero-Marin J, Valenzuela D, et al. Mental health among children and adolescents: construct validity, reliability, and parent-adolescent agreement on the 'Strengths and Difficulties Questionnaire' in Chile. *PLoS One.* 2018;13:e0191809.
- Daza P, Novy DM, Stanley MA, et al. The Depression Anxiety Stress Scale-21: Spanish translation and validation with a Hispanic sample. *J Psychopathol Behav Assess.* 2002;24:195–205.
- Al-Halabí S, Sáiz PA, Burón P, et al. Validación de la versión en español de la Columbia-Suicide Severity Rating Scale (Escala Columbia para Evaluar el Riesgo de Suicidio). *Revista de Psiquiatría y Salud Mental.* 2016;9:134–42.
- García-Nieto R, Blasco-Fontecilla H, Paz Yepes M, et al. Traducción y validación de la Self-Injurious Thoughts and Behaviors Interview en población española con conducta suicida. *Revista de Psiquiatría y Salud Mental.* 2013;6:101–8.
- Rojo-Moreno L, García-Mirallas I, Plumed J, et al. Children's eating attitudes test: validation in a sample of Spanish schoolchildren. *Int J Eat Disord.* 2011;44:540–6.
- Fonseca-Pedrero E, Gooding DC, Ortuño-Sierra J, et al. Assessing self-reported clinical high risk symptoms in community-derived adolescents: a psychometric evaluation of the Prodromal Questionnaire-Brief. *Compr Psychiatry.* 2016;66:201–8.
- UCLA. Brief COVID-19 Screen for Child/Adolescent PTSD. 2020. Available at: <https://ists.org/getattachment/Clinical-Resources/Assessing-Trauma/UCLA-Posttraumatic-Stress-Disorder-Reaction-Index/UCLA-Brief-COVID-19-Screening-Form-English-4-13-20.pdf>.