



SPECIAL ARTICLE

European Network for blood pressure research in children and adolescents (COST Action CA 19115)[☆]



Empar Lurbe^{a,b,*}, Fernando Fernandez-Aranda^{b,c,d}, Elke Wühl^e,
on behalf of HyperChildNET Consortium¹

^a Hospital General, Universidad de Valencia, Valencia, Spain

^b CIBER Fisiopatología Obesidad y Nutrición (CIBEROBN), Instituto de Salud Carlos III, Madrid, Spain

^c Servicio de Psiquiatría, Hospital Universitari de Bellvitge-IDIBELL, Barcelona, Spain

^d Departamento de Ciencias Clínicas, Facultad de Medicina, Universidad de Barcelona, Barcelona, Spain

^e Centro de Pediatría y Medicina de la Adolescencia, Hospital Universitario de Heidelberg, Heidelberg, Germany

Received 11 January 2021; accepted 22 January 2021

Available online 10 March 2021

KEYWORDS

Children;
Adolescents;
Blood pressure;
COST Action

Abstract High blood pressure is a clearly established modifiable risk factor for cardiovascular and renal disease. Although most of its adverse effects develop in adulthood, it has become clear that high BP is a lifelong problem that can manifest early in life. While few would dispute the importance of taking effective steps to identify and manage this condition in middle-aged and elderly individuals, relatively little attention has been paid to the problem of high BP in children and adolescents.

Therefore, the development of actions focused on early childhood, childhood and adolescence and the investigation of the underlying causes of this epidemic are of utmost importance. There is a pressing need for comprehensive pan-European action to increase the knowledge on the prevention, diagnosis and treatment of high blood pressure in children and adolescents, the current scarcity of which impedes the development of consensus across different research fields and hinders efforts to introduce changes in clinical practice. There are some aspects that demand urgent action: the definition of hypertension, the prevalence of high BP in Europe, accurate measurement for early identification, the assessment of hypertension-mediated organ damage and the development and implementation of prevention strategies. In order to provide answers to all of these unanswered questions and challenges, a multidisciplinary network was established, maintained and funded by the European Cooperation in Science and Technology

[☆] Please cite this article as: Lurbe E, Fernandez-Aranda F, and Wühl E. Red europea para la investigación de la presión arterial en niños y adolescentes (COST Action CA19115). *An Pediatr (Barc)*. 2021;94:421.

* Corresponding author.

E-mail address: empar.lurbe@uv.es (E. Lurbe).

¹ Appendix A details the members of the Consortium.

(COST) Association. COST is a funding organization for the creation of research networks known as COST Actions. In this case, the network will promote coordinated and collaborative activities on personalized preventive measures for children and adolescents across Europe.

© 2021 Published by Elsevier España, S.L.U. on behalf of Asociación Española de Pediatría. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

PALABRAS CLAVE

Niños;
Adolescentes;
Presión arterial;
COST Action

Red europea para la investigación de la presión arterial en niños y adolescentes (COST Action CA19115)

Resumen La hipertensión arterial es un factor de riesgo cardiovascular y renal modificable. Aunque la mayoría de los resultados adversos ocurren en la edad adulta, la hipertensión arterial puede estar presente en etapas tempranas de la vida. Mientras pocos cuestionan la importancia de implementar medidas para identificar y manejar esta afección en personas adultas, se ha prestado relativamente poca atención al problema de la hipertensión arterial en niños y adolescentes.

Conocer los orígenes de la hipertensión arterial es un tema que cada vez está más presente en los foros de debate. En este sentido, es absoluta la necesidad de una acción paneuropea con el fin de profundizar en los conocimientos sobre la prevención, el diagnóstico y el tratamiento de la hipertensión arterial en niños y adolescentes. En particular, existen algunas áreas urgentes de intervención tales como la definición de hipertensión, su prevalencia en Europa, la medición precisa para la identificación temprana de valores anormales, la evaluación del daño orgánico mediado por la hipertensión y cómo llevar a cabo estrategias de prevención. Con el fin de proporcionar respuestas a todas estas preguntas, la Comisión Europea ha aprobado y financiado una Asociación de Cooperación Europea en Ciencia y Tecnología (COST). La COST financia la creación de redes de investigación, que en nuestro caso promoverán actividades coordinadas y colaborativas sobre los problemas que presenta la hipertensión arterial en niños y adolescentes. © 2021 Publicado por Elsevier España, S.L.U. en nombre de Asociación Española de Pediatría. Este es un artículo Open Access bajo la licencia CC BY-NC-ND (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

High Blood Pressure (BP) is a clearly established modifiable risk factor for early disability and death. Although most of the adverse outcomes occur in adulthood, it has become clear that high BP is a lifelong problem that can manifest early in life. While few would dispute the importance of taking effective steps to identify and manage this condition in middle-aged and elderly individuals, relatively little attention has been paid to the problem of high BP in children and adolescents. Therefore, developing interventions focused on early life, childhood and adolescence and assessing the underlying causes of this epidemic are of utmost importance.

The considerable interest in children and adolescents currently found in the field of hypertension (HTN)^{1,2} stems from growing evidence that mild hypertension is much more frequent in children and adolescents than was previously thought. Longitudinal studies have evinced that it is not infrequent for BP abnormalities in these age groups to translate into HTN in adulthood, which emphasises the importance of the monitoring this phenomenon not only epidemiologically but also in the clinical setting. Furthermore, HTN in children and adolescents has gained ground in cardiovascular medicine thanks to the progress made in several areas of pathophysiological and clinical research. Prevention could not only an increase in life expectancy but also improve quality of life, reduce health care costs and

help keep individuals active and healthy. Going forward, the progress made to date should inspire advances in research that could be translated into clinical practice.

There is a pressing need for comprehensive pan-European action to increase the knowledge on the prevention, diagnosis and treatment of high blood pressure in children and adolescents, the current scarcity of which impedes the development of consensus across different research fields and hinders efforts to introduce changes in clinical practice. The scientific and clinical communities, decision-makers, stakeholders and society overall must face critical problems associated with high BP in children and adolescents as a cardiovascular risk factor. There are particular aspects that demand urgent action: the definition of HTN, the prevalence of HTN in Europe, accurate measurement of BP for early identification of HTN, the assessment of hypertension-mediated organ damage and the development and implementation of prevention strategies.

In order to provide answers to all of these unanswered questions and challenges, a multidisciplinary network was established, maintained and funded by the European Cooperation in Science and Technology (COST) Association. COST is a funding organization for the creation of research networks, known as COST Actions. In this case, the network will promote coordinated and collaborative activities on personalized preventive measures for children and adolescents

across Europe. These networks offer an open space for collaboration among scientists across Europe and beyond, and thereby give impetus to research advancements and innovation. In this framework, the **HyperChildNET** COST Action (Network for blood pressure research in children and adolescents, Ref. CA19115) is a multidisciplinary network with participants from different European countries that focuses on the urgent subject of high BP, starting its activity in November 2020 for a duration of 4 years. The core of **HyperChildNET** consists of a group of researchers members of the Working Group on Hypertension in Children and Adolescents of the European Society of Hypertension (ESH), who have previously worked together in the development of the ESH guidelines for children and adolescents^{1,3} in cooperation with other experts in the field.

In **HyperChildNET**, internationally renowned researchers, clinicians, early-career researchers, health economists, decision-makers, patients, regulatory bodies, food and nutrition companies, pharmaceutical companies and medical device manufacturers organized in a multidisciplinary network strive to gain a holistic understanding of the factors at play in high BP in children in order to propose and implement corrective and preventive actions of both global and local scope.

The members of the network will collaborate through the creation of working groups to coordinate research activities and exchange scientific and clinical knowledge, research findings and best practices. In order to promote the established research objectives, **HyperChildNET** will organize conferences, seminars, short-term scientific missions and training centres and will produce reports, guidelines, strat-

egy and action plans and research projects to contribute to the progress in addressing this challenge. **HyperChildNET** is the first initiative with a holistic approach to the challenge and that meets the necessary conditions to pursue the work towards achieving its main objectives.⁴

HyperChildNET conveys the findings of several groups that are working on the different challenges in activities coordinated through the network (Fig. 1). The following are some of the many ambitious achievements that will be shared with the scientific community:

- Benchmark report of the different BP measurement methods and values with guidance on device accuracy and quality criteria for the main specific uses in children and adolescents.
- Report of a map of BP values based on BP measurements and epidemiological factors and generation of European tables of reference values for BP and 24-h ABPM for office use merging the existing data.
- Assessing the health care burden and cost-effectiveness of screening children and adolescents in Europe for high BP applying the new thresholds and reference values.
- Guidance for health professionals on when and how to assess biomarkers and target organ damage, and which biomarkers and target organs to assess.
- White paper on the prevention of high BP in children and adolescents (guidelines, protocols and policy proposals), including specific recommendations for target groups, parents and educators.

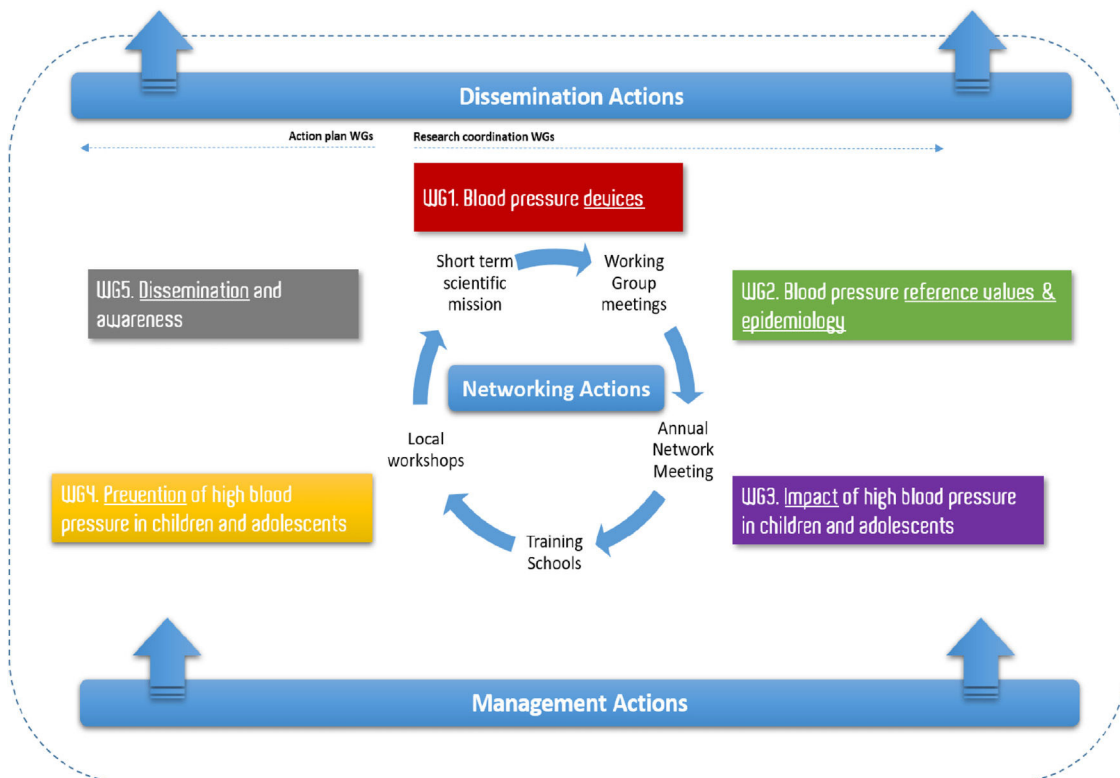


Figure 1 Visual summary of multivariable interaction in the **HyperChildNET** network.

- Online platform hosting a repository of eHealth best practices, with an emphasis on mHealth, for the prevention of high BP in children and adolescents.
- Report on the economic evaluation (cost-effectiveness) of the proposed clinical and community-based public health interventions for BP prevention.

All of these are part of a dissemination strategy that includes guidelines, online content and social network accounts and the development of a policy brief for the Committee on Environment, Public Health and Food Safety of the European Parliament. Moreover, the dissemination of knowledge is critical to the impact of the project; the network directly involves key stakeholders that will use the generated knowledge to achieve the established objectives. This generation and transfer of knowledge will also provide a breeding ground for the design of new research projects to be implemented at the local or international level supported by private and/or public funding, including European Union programmes (Horizon Europe, European Commission Health Program, EUREKA, Interreg, Erasmus+, etc.).

HyperChildNET is also planning educational interventions to develop the skills of early-career researchers with the aim of building and ensuring the future research community through young researchers in the specific field of BP in children and adolescents. The planned online and offline educational activities will provide students with core knowledge and critical appraisal skills on this specific subject.

Lastly, **HyperChildNET** combines the rigour of the challenge, the achievement of progress beyond the state-of-the-art, adding the value of networking to excellence in science and technology, with an impact on science, society and competitiveness and potential for breakthroughs and innovation. Taking measures to maximize the impact through a coherent and effective work plan will provide the necessary tools for success.

Funding

This article is based on work developed by the COST Action HyperChildNET (CA19115), supported by COST (European Cooperation in Science and Technology).

Conflict of interests

The authors declare that they have no conflict of interest.

Appendix A. Members of the Consortium

Coordinator: E. Lurbe; Bosnia and Herzegovina (Šekib Sokolović); Croatia (Vesna Herceg-Cavrak); Cyprus (Nikos Karpettas); Denmark (Michael Hecht Olsen); Estonia (Inna Kramer and Dr Lagle Suurorg); Germany (Elke Wühl and Thorsten Meier); Greece (Stella Stabouli and Katerina Chrysaidou); Hungary (Denes Pall); Italy (Guiseppe Mancina, Claudio Borghi, Alberto Sana, Elettra Oleari); Lithuania (Augustina Jankauskiene); Netherlands (Karel Herberigs); Norway (Asle Hirth); Poland (Mieczyslaw Litwin and Dorota Drozd); Portugal (Jorge Polonia); Slovenia (Anamarija Meglic); Spain (Fernando Fernandez-Aranda; Salvador Peiró; Beatriz G Lopez-Valcarcel; Mónica Redón; Javier Morales); Switzerland (Giacomo Simonetti); Turkey (Serap Erdine); United Kingdom (Manish Sinha, Kjell Tullus, Nicholas Webb, Anna Dominiczak); United States (Javier Calpe).

References

1. Lurbe E, Agabiti-Rosei E, Cruickshank JK, Dominiczak A, Erdine S, Hirth A, et al. 2016 European Society of Hypertension guidelines for the management of high blood pressure in children and adolescents. *J Hypertens.* 2016;34:1887–920.
2. Flynn JT, Kaelber DC, Baker-Smith CM, Blowey D, Carroll AE, Daniels SR, et al. Subcommittee on Screening and Management of High Blood Pressure in Children. Clinical practice guideline for screening and management of high blood pressure in children and adolescents. *Pediatrics.* 2017;140:e20171904.
3. Lurbe E, Litwin M, Pall D, Seeman T, Stabouli S, Webb NJA, et al. Working Group of the 2016 European Society of Hypertension Guidelines for the Management of High Blood Pressure in Children and Adolescents. Insights and implications of new blood pressure guidelines in children and adolescents. *J Hypertens.* 2018;36:1456–9.
4. Lurbe E, HyperChild NET Network. Network for blood pressure research in children and adolescents: a cost action. *J Hypertens.* 2020;38:2331–4, <https://www.cost.eu/actions/CA19115/#tabs|Name:overview>.