

Healthy lifestyle habits in primary education: a systematic review

Hábitos de vida saludables en educación primaria: revisión sistemática

<https://doi.org/10.4438/1988-592X-RE-2024-406-646>

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Abstract

The school environment has the potential to influence both the health and well-being of pupils. In this sense, many studies have analysed and evaluated educational interventions for the promotion of healthy lifestyle habits in primary education. However, many were developed outside the curricular areas, without considering their value in the promotion of these habits. Therefore, this article aims to analyse interventions carried out to improve healthy lifestyle habits in primary school pupils within the curricular space between 2015 and 2022. To this end, a systematic review was performed following the PRISMA statement. The article selection process yielded a total of 24 articles for analysis, of which descriptive and content analyses were conducted. The following variables were analysed: population, subject, agent directing the intervention, intervention

structure, type of activities, training, family involvement, additional tasks, and resources used. The general results confirm the lack of a declarative framework regarding aspects or dimensions encompassing healthy lifestyle habits in educational interventions of primary education. Nevertheless, the analysis concludes that there are elements specific to aspects related to physical activity, nutrition, emotional well-being, and hygiene.

Keywords: healthy lifestyle habits, primary education, curriculum, educational program, intervention.

Resumen

El entorno escolar tiene el potencial de influir tanto en la salud como en el bienestar del alumnado. En este sentido, han sido numerosos los estudios que analizan y evalúan intervenciones educativas para el fomento de los hábitos de vida saludables en Educación Primaria. Aun así, muchos, se han desarrollado fuera de las áreas curriculares, sin tener en cuenta el valor de estas en el fomento de dichos hábitos. Por tanto, el presente artículo tiene por objetivo analizar intervenciones realizadas para mejorar los hábitos de vida saludables en el alumnado de Educación Primaria en el espacio curricular entre los años 2015-2022. Para ello, se realizó una revisión sistemática siguiendo la declaración PRISMA. El proceso de selección de artículos arrojó un total de 24 artículos a analizar, en los cuales se realizó un análisis descriptivo y un análisis de contenidos. Las siguientes variables fueron analizadas: población, asignatura, agente que dirige la intervención, estructura de la intervención, tipo de actividades, formación, implicación de la familia, tareas adicionales, y recursos utilizados. Los resultados generales permiten confirmar la inexistencia de un marco declarativo sobre los aspectos o dimensiones que abarcan los hábitos de vida saludables en las intervenciones educativas de Educación Primaria. No obstante, del análisis se concluye que se observan elementos propios de aspectos relacionados con la actividad física, la nutrición, el bienestar emocional y la higiene.

Palabras clave: hábitos de vida saludables, educación primaria, currículum, programa educativo, intervención.

Introduction

The WHO-UNICEF-Lancet Commission highlights the existence of a global issue of child health and well-being and advocates placing child well-being at the centre of Sustainable Development Goals (SDGs) policies (Clark et al., 2020). Regarding this global issue, non-communicable or lifestyle diseases (Akseer et al., 2020, WHO, 2022) are key agents.

These diseases originate in childhood and are determined by factors such as physical inactivity, an unhealthy diet, or unhealthy or unsafe environments (WHO, 2022). The relationship between the influence of childhood experiences and future health status has been documented (Hahnrahts et al., 2021; Whitaker et al., 1997). Therefore, it is essential to promote what the literature defines as healthy lifestyle habits (HLH) during the first years of life to develop and adhere to them during adult life (Gámez-Calvo et al., 2022; Hahnrahts et al., 2021; Invernizzi et al., 2019; Langford et al., 2014; Moscoso-Loaiza & Díaz-Heredia, 2018).

HLH are a way of life that reduces the risk of disease or premature death (WHO, 1999). The literature does not have a unified approach as to which habits constitute this way of life, however, it seems that physical activity (PA) and nutrition are two essential elements (de Villier et al., 2016; Jimenez-Parra et al., 2022; López et al., 2021; WHO, 1999), evidencing the need to address this issue. These habits are formed from childhood, require learning and repetition, and can even become unconscious (Moscoso-Loaiza & Díaz-Heredia, 2018; Oberto et al., 2020). The fact that this occurs in the developmental phase of children means that both the family and education become determining axes of its perpetuation (Gámez-Calvo et al., 2022; Hung et al., 2015; WHO, 2021).

Since 1985, WHO, UNESCO, and UNICEF began to structure the Health-Promoting School approach (WHO, 2021), highlighting the importance of the school environment in influencing the health and well-being of pupils (Bonell et al., 2013; Langford et al., 2014). Children spend a large part of the day at school and, as various studies reveal, this school period in the classroom can become a very useful time for educating and acquiring HLH (Hahnrahts et al., 2021; Pulido-Gil et al., 2022), for example, through the promotion of school-based programs (Jones et al., 2020; Markov et al., 2020). In this sense, programs promoting HLH should be holistic, in which all educational agents are integrated: management team, teachers, and family (Gámez-Calvo et al., 2022; Harris & Cale, 2018; and Moscoso-Loaiza & Díaz-Heredia, 2018).

For all these reasons, a systematic review is presented to understand the dimensions encompassing HLH within the primary education (PrE) curriculum, and, from a pedagogical point of view, to report on the type of interventions carried out from when the SDGs were adopted (2015) to the date of the study (2022).

Method

This systematic review followed the PRISMA 2020 statement. The research question, search strategy, and inclusion and exclusion criteria were elaborated via the same PRISMA statement (Page et al., 2021).

Eligibility Criteria

Using the PICO strategy (Table I) established by the *National Institute for Health and Care Excellence* (Schardt et al., 2007), the research question was posed: What interventions (I) have been implemented to improve the healthy lifestyle habits (O) of pupils in PrE (P)? Accordingly, inclusion and exclusion criteria were designed, and articles with qualitative, quantitative, and mixed designs were considered. The term comparison (O) was excluded because a comparison between studies was not sought.

TABLE I. Inclusion and exclusion criteria formulated with the PICO strategy

	Population	Intervention	Results
Inclusion criteria	PrE pupils	HLH interventions in PrE within the curricular setting that detail their procedure and assessment	They report on findings obtained in an HLH
Exclusion Criteria	<ul style="list-style-type: none"> • Pupils who are not in PrE. • Pupils with any type of disease (diabetes, obesity, asthma, cancer, cerebral palsy, intellectual disability...) • Parents, teachers, school staff • Other professions, players, adults, elderly, refugees, people in orphanages, women. 	<ul style="list-style-type: none"> • Extracurricular interventions, co-curricular interventions, training, status analysis • Non-interventions • Interventions without procedures or evaluations • Validation of scales and tools • Systematic reviews or meta-analyses. • Congresses • Interventions not aimed at pupils • Interventions aimed at preventing obesity or overweight 	<ul style="list-style-type: none"> • They do not report results regarding HLH.

Source: Compiled by the authors.

Information sources

The Scopus, PubMed, Web of Science (WoS), and ERIC databases were searched on 27 October 2022. English was the predominant language (87.5%), followed by Spanish (12.5%). The search focused on articles published in journals from the year of creation of the SDGs (2015) to the year of the search strategy design (2022). Book chapters, systematic reviews or meta-analyses, and reports and proceedings of scientific conferences were excluded.

Search strategy

Using the PICO strategy, the research question that guided the systematic review was established. The search equation was appropriate to the conditions of each database, using the Boolean operators AND and OR (Table II) (Methley et al., 2014).

TABLE II. Keywords formulated with the PICO strategy

	[1] Population	[2] Intervention	[3] Results
Keywords	"primary school*" OR "primary grad*" OR "primary education*" OR "elementary school" OR "elementary education"	intervention* OR program* OR activit*	"healthy lifestyle*" OR "healthy habit*" OR "well?being" OR wellness
Searches	In Scopus: TITLE/ABS/KEY [1] AND TITLE/ABS/KEY [2] AND TITLE/ABS/KEY [3] In PubMed: TITLE/ABSTRACT [1] AND TITLE/ABSTRACT [2] AND TITLE/ABSTRACT [3] In WoS: TOPIC(TS) [1] AND TOPIC(TS) [2] AND TOPIC(TS) [3] In ERIC: TITLE/DESCRIPTOR [1] AND TITLE/DESCRIPTOR [2] AND TITLE/DESCRIPTOR [3]		
Limits	In Scopus: AND PUBYEAR > 2014 AND (LIMIT-TO (DOCTYPE,"ar") OR LIMIT-TO (DOCTYPE,"re")) In PubMed: AND (2015:2022[pdat]) In WoS: refined by: Publication year (2015-2022) and Document types (Article or Review) In ERIC: pubyearmin:2015		

Source: Compiled by the authors.

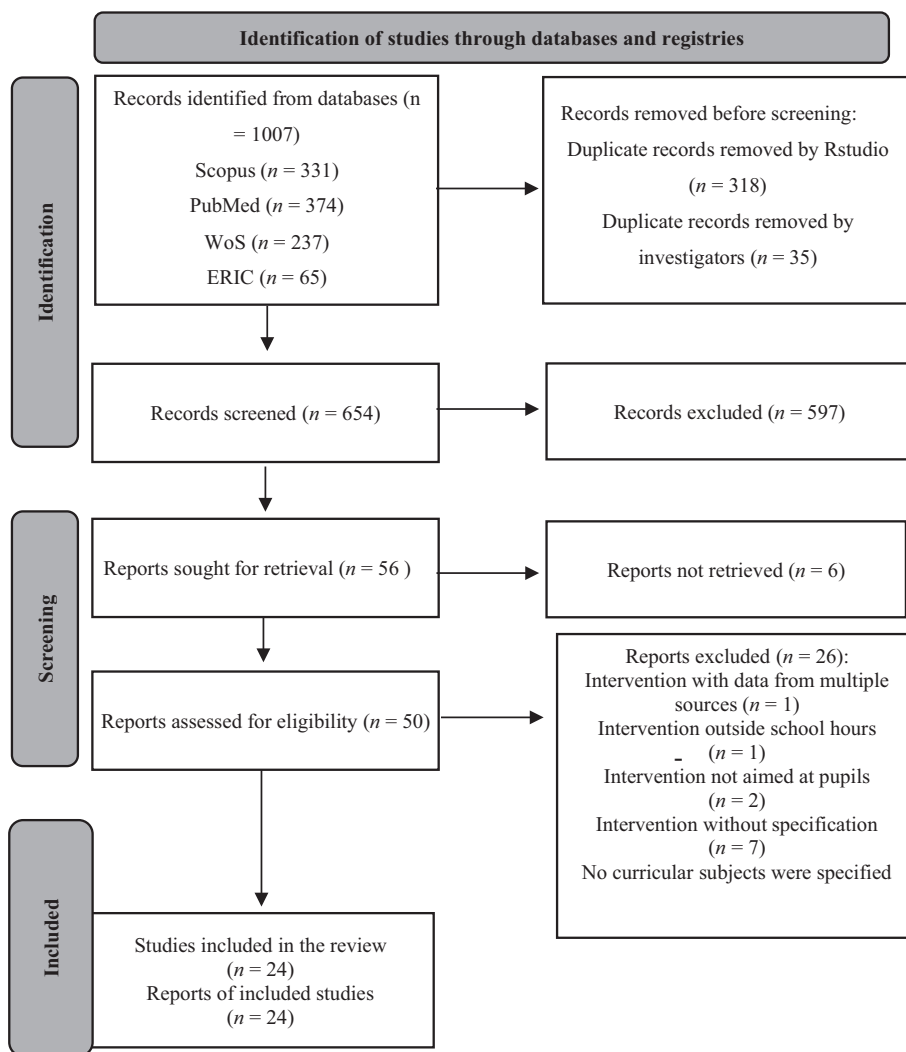
Note: []: Indicates the numbering of the keywords used in the search. These are reflected in each database search.

Data collection and selection process

The researchers defined the terms to be used in the PICO strategy. The search was reviewed by the staff of the Resource Centre for Learning and Research (RCLR) of the University of Deusto to reaffirm the suitability of the search. The studies identified were selected based on inclusion and exclusion criteria (Table I). The selection process (Figure I) was carried out by the responsible investigators. Independently, they reviewed the screening of titles, abstracts, and studies in an Excel document. In case of discrepancy, this was resolved by discussion until a simple majority consensus was reached. Thus, of the 1007 studies identified (654 excluding duplicates) in the Scopus, PubMed, WoS, and ERIC databases, 24 studies were selected for analysis. Duplicate documents were removed using Rstudio (R.4.2.0) ($n = 318$) and independently reviewed and excluded by the study researchers ($n = 35$). This selection process followed the inclusion and exclusion criteria (Table I).

The principal investigator analysed the studies selected and reviewed by the other two investigators. Content analysis was performed using the ATLAS.ti programme (22.1.5.0) and an Excel spreadsheet.

FIGURE I. Flowchart of the study selection procedure



Source: Page, M.J., McKenzie, J.E., Bossuyt, P.M., Boutron, I., Hoffmann, T.C., Mulrow, C.D., Shamseer, L., Tetzlaff, J.M., Akl, E.A., Brennan, S.E., Chou, R., Glanville, J., Grimshaw, J.M., Hróbjartsson, A., Lalu, M.M., Li, T., Loder, E.W., Mayo-Wilson, E., McDonald, S., ... Moher, D. (2021). The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *BMJ British Medical Journal*, 372(71), 1-9. <http://doi.org/10.1136/bmj.n71>.

Data Elements

The variables for which data were searched are detailed below (Table III).

TABLE III. The variables for which data were searched

Variables	Description of the variables
1. Type of article	Quantitative, qualitative, or mixed
2. Year	2015-2022
3. Journal	Name of the journal
4. Country	The country where the intervention was implemented
5. Aim	Description of the aim of the study
6. Sample	The study population
7. Study Intervention: (1) Overview; (2) type of activities; (3) required training or not; (4) required the involvement of families; (5) included additional tasks	(1) Brief description of the intervention (2) Type of activities carried out (3) Whether agents were trained or not (4) Whether families formed part of the interventions (5) Whether or not the interventions included additional tasks
8. The subject(s) within which the intervention was carried out	Curricular integration (various curricular subjects) Curricular subject (a single curricular subject)
9. Agent	The person involved in the implementation of the intervention
10. Resources	The resources used during the intervention
11. Results	Brief description of the main results

Source: Compiled by the authors.

Data analysis

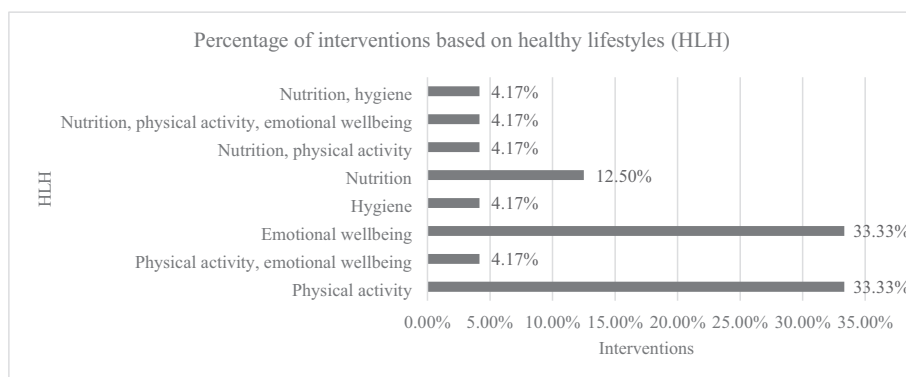
Data analysis was performed using a descriptive analysis and content analysis of the studies. The variables were grouped into different categories: participant variables (age, course), context variables (publication date, PrE schools, and curricular timetable), methodological variables (study design), extrinsic variables (studies published in JCR impact journals), and intervention variables (description, type of activity, structure, family involvement, training, tasks, resources).

Results and discussion

Descriptive analysis

Of the 24 articles, 37.93% included PA as part of their intervention, 34.48% emotional well-being, 20.69% nutrition, and 6.90% hygiene. These HLH were grouped in some interventions working on several variables simultaneously; therefore, there are univariate and multivariate interventions (Figure II).

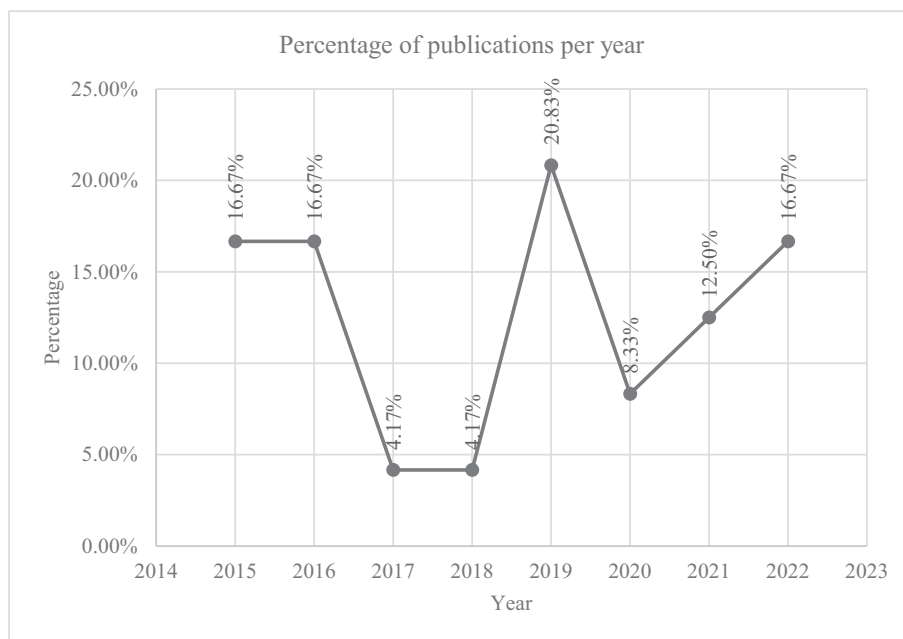
FIGURE II. Number of interventions based on healthy lifestyle habits (HLH)



Source: Compiled by the authors.

These articles were published in 20 different journals, with the *International Journal of Environmental Research and Public Health* being the most frequent (16.67%), followed by *Trials* (8.33%). Regarding the publication date, the number of studies published over the seven years varied from one publication per year to five, four being the most frequent number (Figure III).

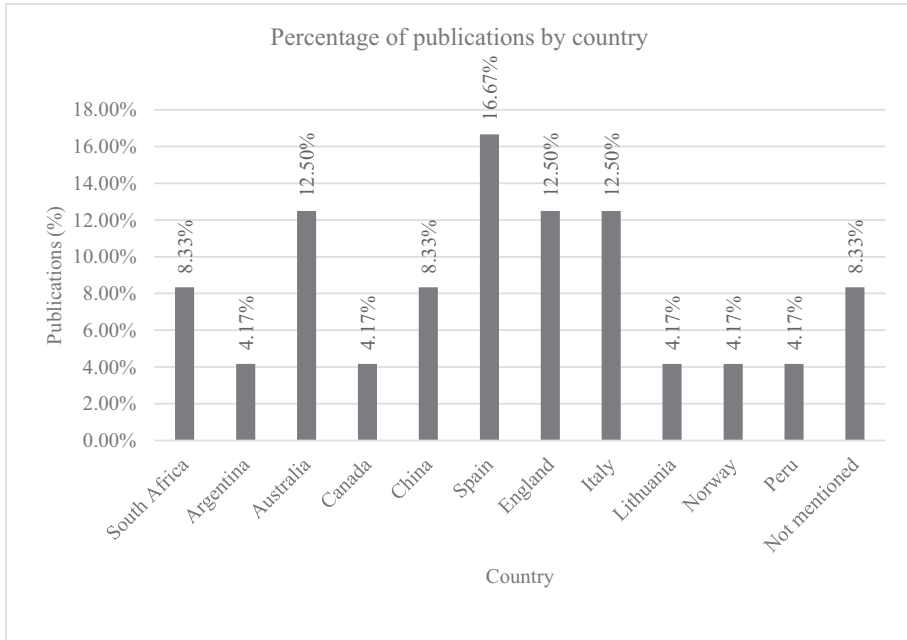
FIGURE III. Number of publications per year



Source: Compiled by the authors.

Likewise, interventions were identified across 12 countries, with Spain performing the most interventions (16.67%), followed by England (12.50%), Italy (12.50%), and Australia (12.50%) (Figure IV). In general terms, PA, emotional well-being, and nutrition were the HLH worked on in these interventions. PA was present in 53.85% of the studies, emotional well-being in 46.15%, and nutrition in 23.08%. It is worth mentioning that 15.38% of these studies worked on more than one HLH, all of which were implemented in Spain. This same country, Spain, was the only one that worked on the three aforementioned HLH (8.33% PA, 8.33% emotional well-being, and 12.50% nutrition), whereas England (4.17% PA, 8.33% emotional well-being, and 0% nutrition), Italy (8.33% PA, 4.17% emotional well-being, and 0% nutrition), and Australia (8.33% PA, 4.17% emotional well-being, and 0% nutrition) did not work on nutrition in any of the interventions selected in this study.

FIGURE IV. Number of publications by country



Source: Compiled by the authors.

The overall results from the 24 articles (75% quantitative and 25% mixed) are listed below (Table IV).

TABLE IV. Objective and overall results of the selected studies

HLH	Item Type	Article	Focus	General results
Physical activity	Quantitative	Atkinson et al. (2015)	One group	Increased children's subjective well-being and confidence in social interactions.
		Brustio et al. (2019)	Quasi-experimental	Positive impact on physical functions.
		Goswami et al. (2021)	Quasi-experimental	Reduced body weight and increased muscle and bone mass.

(Continued)

TABLE IV. Objective and overall results of the selected studies (Continued)

HLH	Item Type	Article	Focus	General results
		Kliziene et al. (2021)	Quasi-experimental	Impact on somatic, personality, and social anxieties. Increased PA levels.
		Lu et al. (2022)	Quasi-experimental	Improvement in pupils' attitudes towards PA and behavioural cognition.
		Mavilidi et al. (2019)	Quasi-experimental	Positive effects: executive function skills, and shifting performance.
	Mixed	Invernizzi et al. (2019)	Quasi-experimental	Increased confidence level, motor competence, enjoyment, and amount of PA, time spent on a task, and, satisfaction with PE classes and teaching styles. Decreased time wasting in PE.
		Watson et al. (2017)	Quasi-experimental	Improvement in key educational outcomes.
Physical activity, emotional well-being	Mixed	Jimenez-Parra et al. (2022)	Quasi-experimental	Improvement: executive functions, academic performance, and psychosocial aspects. Promoted the improvement of health-related quality of life.
Emotional well-being	Quantitative	Crescentini et al. (2016)	Quasi-experimental	Improvement: cognitive, emotional, and social abilities. Positive effects: attentional skills, ADHD symptoms, and emotional functions.
		Kishida et al. (2022)	One group	Benefits: in levels of peer support and pupil loneliness, and the self-efficacy of parents.
		Schonnert et al. (2015)	experimental	Improvement: executive functions, self-reported measures of well-being, self- and peer-reported prosocial behaviour, and mathematics performance.
		Shum et al. (2019)	Quasi-experimental	Improvement; Mental health knowledge.
		Sitzer et al. (2015)	One group	Improvement: resilience and social and emotional functioning.

TABLE IV. Objective and overall results of the selected studies (*Continued*)

HLH	Item Type	Article	Focus	General results
		Suldo et al. (2015)	One group	Improvement: positive emotions, overall satisfaction with life, and satisfaction with themselves, their friends, and the environment in which they lived.
		Vickery et al. (2016)	Quasi-experimental	Improvement: metacognition; Decreased: negative affect.
	Mixed	Humphrey et al. (2018)	Randomised Controlled Trial	Improvement: children's social skills; perception of social and peer support; Decreased: exclusions; Significant impact: children's psychological well-being.
Hygiene	Mixed	Oberto et al. (2020)	One group	Improvement: feedback and collective construction of knowledge; creation of an enabling environment to promote healthy behaviours.
Nutrition	Quantitative	de Villiers et al. (2016)	Quasi-experimental	Improvement: knowledge of nutrition and children's self-efficacy.
		Martinez-Garcia and Trescastro-López et al. (2016)	One group	Improvement: knowledge and consumption of healthy foods. Reduction: Consumption of unhealthy foods.
		Garcia & Fernandez (2022)	Quasi-experimental	Improvement: adherence to the Mediterranean diet.
Nutrition, Physical Activity	Quantitative	Gerber et al. (2020)	Randomised, placebo-controlled trial	(1) Understanding the effects of an intervention combining PA and multi-micronutrient supplementation. (2) New insights into training schools to implement PA data. Update on the status of micronutrient deficiencies, inflammatory and cardiovascular risk markers, and communicable diseases in selected communities.

TABLE IV. Objective and overall results of the selected studies (Continued)

HLH	Item Type	Article	Focus	General results
Nutrition, Physical Activity, Emotional Well-Being	Mixed	Santos-Beneit et al. (2019)	One group	Increased: KAH scores towards a healthy lifestyle.
Nutrition, hygiene	Quantitative	López et al. (2021)	Quasi-experimental	Improvement: HLH, consumption of water, fruit, and vegetables and washing and dental hygiene practices. Decreased: consumption of soft drinks.

Source: Compiled by the authors.

Note: ADHD: attention deficit hyperactivity disorder; KAH: Knowledge, Attitudes, and Habits; PA: Physical Activity

Content analysis of the studies

The content analysis was divided into two sections. First, the general contents of the studies were analysed based on three axes (Table V): population, subject, and agent directing the intervention. Secondly, the interventions carried out were analysed in more depth, this time on seven axes (Table VI): description; intervention structure: frequency (F), time (T), intensity (I), type of activities, training, family involvement, additional tasks, and resources.

TABLE V. Summary of the analysis of the general contents of the studies


























Article	Population	Subject	Person conducting the intervention
Atkinson et al. (2015) 	$N_{pupils} = 28$ 7 & 8 years old	CI: CS	Dancers CT
Brustio et al. (2019) 	$N_{pupils} = 795$ 6-9 years	CI: CS (not PE)	CT
Crescentini et al. (2016) 	$N_{pupils} = 31$ 7-8 years	CI: CS	Mindfulness Meditation Instructors
de Villiers et al. (2016) 	$N_{pupils} = 998$ 4th year	CI: CS	Educators

TABLE V. Summary of the analysis of the general contents of the studies (Continued)

Article	Population	Subject	Person conducting the intervention
Gerber et al. (2020) 	$N_{pupils} = 330$ 6-12 years	CI: CS	CT Instructors
Goswami et al. (2021) 	$N_{pupils} = 917$ 1-6th year	CI: CS	CT
Humphrey et al. (2018) 	$N_{pupils} = 5218$ 7-9 years 3-5th years	CI: CS	CT
Invernizzi et al. (2019) 	$N_{pupils-quantitative} = 121$ $N_{pupils-quantitative} = 28$ 10-11 years	CS: PE	PE Graduate students, CT
Jimenez-Parra et al. (2022) 	$N_{pupils} = 250$	CI: CS	CT
Kishida et al. (2022) 	$N_{pupils} = 37$ 10 & 12 years	CI: CS	CT, Family
Kliziene et al. (2021) 	$N_{pupils} = 364$ 6-9 years	CS: PE	PE Faculty
López et al. (2021) 	$N_{pupils} = 108$ 6-13 years	CI: CS	Nursing Student, CT
Lu et al. (2022) 	$N_{pupils} = 366$ 8-11 years	CS: PE	PE Teachers, Family
Martinez-Garcia and Trescastro-López (2016) 	$N_{pupils} = 28$ 8 & 9 years old 3rd year	CI: CS	Dietitian-nutritionist, CT, tutor teachers, PE teachers
Mavilidi et al. (2019) 	$N_{pupils} = 10$ schools 4th year	CS: English	CT
Oberto et al. (2020) 	$N_{pupils} = 564$ 4-10 years 1-3rd year	CS: social sciences	Researchers
Garcia & Fernandez. (2022) 	$N_{pupils} = 38$ 6-7 years 1st year	CS: PE	NS
Santos-Beneit et al. (2019) 	$N_{pupils} = 1770$ 1-6th year	CI: CS	NS
Schonnert et al. (2015) 	$N_{pupils} = 99$ 9-12 years 4-5th year	CI: CS	NS

Article	Population	Subject	Person conducting the intervention
Shum et al. (2019) 	$N_{pupils} = 459$ 8-12 years	CI: CS	Graduates or students of a master's degree in Counselling or Counselling and Clinical Psychology or teachers with previous training
Sitzer et al. (2015) 	$N_{pupils} = 43$ 9-12 years 4-6th year	CS: single group of subjects that promote coping skills and resilience	NS
Suldo et al. (2015) 	$N_{pupils} = 12$ 9-10 years 4th year	CS: Math, Science	CT, School Psychologist & Researchers
Vickery et al. (2016) 	$N_{pupils} = 71$ 7-9 years	CS: personal and social education	CT
Watson et al. (2017) 	$N_{schools} = 6$ 8-10 years 3-4th year	CI: CS	CT, Researchers

Source: Compiled by the authors.

Note: : physical activity; : emotional well-being; : nutrition; : hygiene; PE, physical education; CS: curricular subject; CI: curricular integration; NS: not specified; CT: Classroom Teachers.

Population

Of the 24 studies, 98.84% indicated the course or age of the pupils. Interventions reporting on the course were classified according to age: first (6-7 years), second (7-8 years), third (8-9 years), fourth (9-10 years), fifth (10-11 years), and sixth (11-12 years).

Age is relevant for educating pupils in HLH (García-Muñoz et al., 2022; Langford et al., 2014). In this study, the ages of nine (22%), ten (18%), and eight (17%) years present a greater congregation of HLH interventions in the curriculum, and, although previous reviews did not report an impact of age on interventions (Hung et al., 2015), there is evidence that older pupils show a better understanding of the concepts of the intervention (Stice et al., 2006).

Subject

All studies mentioned the subjects in which the interventions were carried out.

They were all part of the curriculum, as school time is a useful period for educating and acquiring HLH (Hahnrahts et al., 2021; Pulido-Gil et al., 2022). A total of 62.53% were carried out in curricular integrations (inclusion of more than one curricular subject in the study), and the rest in a single curricular subject. All curricular integrations were directed at unspecified curricular subjects (58.33%), and, in one case, physical education (PE) was excluded from the integration (4.17%). In terms of curricular subjects, PE (16.67%) was the subject where most interventions were directed. PE can achieve HLH and generate a relevant impact on them (Invernizzi et al., 2019; Kliziene et al., 2021). Nonetheless, it is important to intervene in the other subjects as many are taught largely in a sedentary manner (Daly-Smith et al., 2021), which can become a strategy to promote and acquire HLH through curricular plans. In Spain, for example, HLH are closely related to the area of Knowledge of the Natural, Social and Cultural Environment (Royal Decree 157/2022). In this study, the remaining subjects each accounted for 4.17% of the interventions.

Agent







Of the 24 studies, 94.59% provided information about the agent. Some interventions were developed with the assistance of several members.








Teachers are the agents charged with imparting the classroom programme and the learning process of pupils (Royal Decree 157/2022). Thus, the review indicated that school teachers were mainly in charge of the development of the interventions (51.35%). Specifically, classroom teachers were those who carried out most interventions (43.24%), while the rest were led by PE teachers (5.41%) or by teachers trained *ad hoc* (2.70%). This is of interest, as interventions carried out by school teachers are more likely to be integrated into curricula and sustained over time (de Bourdeaudhuij et al., 2010; Fairclough et al., 2013). In addition, it is worth noting the low incidence of PE teachers as previous studies have shown that they play a fundamental role in health-related experiences

(Invernizzi et al., 2019; López-Gil, et al. 2020). Finally, and in contrast to previous studies (Hung et al., 2015; Stice et al., 2006), interventions aimed at promoting HLH seem to reserve a high training space (44%) for external agents.

Table VI provides an in-depth analysis of the interventions, namely: structure, type of content, type of activity, family involvement, additional tasks, and resources.






TABLE VI. Summary of the analysis of the contents of the study interventions









Article	Structure	Content Type	Type of activities	Family Involvement	Additional Tasks	Resources	Resources
Atkinson et al. (2015) 	F: No T: No D: 3 months I: No	Procedural Attitudinal Conceptual	Body Movement (BL, MH) Awareness Values and Emotions Knowledge Acquisition	x	✓	x	Audiovisual
Brustio et al. (2019) 	F: 3 times a week T: 15 min D: 3 months I: No	Procedural	Body Movement (MS)	✓	x	x	NS
Crescentini et al. (2016) 	F: 3 times a week T: 1-2 weeks (30 min); 3-4 weeks (45-55 min); 7-8 weeks (1 h 30 min) D: 8 weeks I: No	Procedural Attitudinal	Relaxation & Mindfulness Awareness	x	x	x	Audiovisual
de Villiers et al. (2016) 	F: No T: No D: 3 years I: No	Procedural Attitudinal Conceptual	Knowledge Acquisition Awareness Experimental-Manipulative	✓	✓	x	Printed matter
Gerber et al. (2020)  	F: No T: No D: No I: No	Procedural	Body Movement (AR, PE, BL)	✓	✓	x	NS

Article	Structure	Content Type	Type of activities	Family Involvement	Additional Tasks	Resources	Resources
Goswami et al. (2021) 	F: No T: 135 min D: No I: moderate-vigorous	Procedural	Body Movement (MS)	x	x	x	NS
Humphrey et al. (2018) 	F: 2 times per week T: 30-40 min D: 1 academic year I: No	Conceptual Attitudinal	Knowledge Acquisition Awareness	✓	✓	✓	Printed matter
Invernizzi et al. (2019) 	F: 2 h per week T: 2 h D: 12 weeks I: No	Procedural	Values and emotions	✓	x	x	NS
Jimenez-Parral et al. (2022)  	F: 2-4 times a day (10-16 sessions a week) T: 1 h D: 1 academic year I: Vigorous	Attitudinal Procedural	Values & Emotions Awareness Body Movement (AR)	✓	x	✓	Audiovisual
Kishida et al. (2022) 	F: No T: 40-60 min D: 12 months I: No	Attitudinal	Values and emotions	x	✓	x	NS
Kiziene et al. (2021) 	F: 3 times a week T: 30-45 min D: 8 months I: No	Procedural	Body Movement (MS) Relaxation & Mindfulness	x	x	x	Printed matter

(Continued)





TABLE VI. Summary of the analysis of the contents of the study interventions (Continued)

Article	Structure	Content Type	Type of activities	Family Involvement	Additional Tasks	Resources	Resources
López et al. (2021) 	F: No T: 1 h D: 6 months I: No	Attitudinal Procedural	Awareness Experimental- manipulative	✓	✗	✗	NS
Lu et al. (2022) 	F: Once a week (EMWKG sheets); 3 times a week (PE homework) T: No D: 15 weeks I: No	Procedural Attitudinal Conceptual	Knowledge Acquisition Body Mobility (MS) Experimental- Manipulative	✗	✓	✓	Printed matter, illustrations; audiovisual
Martinez-Garcia and Trencastro- López (2016) 	F: No T: 60-90 min D: 1 month (5 sessions) I: No	Conceptual Procedural	Knowledge acquisition Experimental- manipulative	✗	✓	✗	NS
Mavilidi et al. (2019) 	F: 3 times a week T: 40 min D: 6 weeks I: No	Procedural	Body Movement (MS)	✓	✗	✗	NS
Oberto et al. (2020) 	F: No T: No D: 3 years (17 workshops) I: No	Attitudinal Procedural	Experimental- Manipulative Awareness	✗	✗	✗	Book




Article	Structure	Content Type	Type of activities	Family Involvement	Additional Tasks	Resources	Resources
Garcia & Fernandez (2022) 	F: Once a week T: No D: 5 weeks I: No	Procedural Attitudinal Conceptual	Experimental- Manipulative Awareness	✓	✗	✗	NS
Santos-Beneit et al. (2019)   	F: No T: No D: No I: No	Procedural Attitudinal Conceptual	Knowledge Acquisition Awareness Values and Emotions	✓	✓	✓	Audiovisual, manipulative
Schonnert et al. (2015)  	F: Once a week (lesson) / 3 times a day (basic mindfulness practices) T: 40-50 min D: 4 months (12 sessions) I: No	Procedural	Values and emotions	✗	✗	✗	Audiovisual
Shum et al. (2019)  	F: No T: 20 min D: 11 game-based digital lessons, and, 8 in-class teachings. I: No	✗	Values and emotions	✓	✗	✗	Digital

(Continued)

TABLE VI. Summary of the analysis of the contents of the study interventions (Continued)

Article	Structure	Content Type	Type of activities	Family Involvement	Additional Tasks	Resources	Resources
Sitzer et al. (2015) 	F: Once a week T: 60 min D: 14 weeks I: No	Procedural conceptual	Knowledge Acquisition Relaxation and Mindfulness Values and Emotions (Mindfulness) Experimental-Manipulative Awareness	x	x	x	Printed matter illustrations
Suldo et al. (2015) 	F: No T: 30-50 min D: 11 sessions I: No	Procedural Conceptual	Values & Emotions Knowledge Acquisition	x	x	x	NS
Vickery et al. (2016) 	F: 1 topic per week (except 2 topics that took 2 weeks) T: 30-60 min D: 12 half-hour lessons in total I: No	Procedural	Relaxation and mindfulness	✓	✓	✓	NS
Watson et al. (2017) 	F: 3 times a day T: 5 min D: 6 weeks I: Moderate	Procedural	Body Movement (AR, BL, MS)	✓	✓	x	Audiovisual

Source: Compiled by the authors.

Note: : physical activity; : nutritional well-being; : emotional well-being; : hygiene; ✓: Yes; x: no; F: frequency; T: Time; D: duration; I: intensity; MS: motor skill; AR: active rest; BL: body language; NS: Not specified.

Structure

The structure of the interventions was classified according to frequency (F), time (T), duration (D), and intensity (I). Frequency refers to the number of times the intervention was performed. A higher weighting of interventions performed once and three times per week (20%) was observed. This could be because habits require repetition and learning (Mosocosoa-Loaiza & Días-Heredia, 2018; Oberto et al., 2020). In terms of the duration of the intervention activities, 30-60 minutes (44%) were the most common durations. The period of the interventions indicated the duration of the intervention (sessions, weeks, or years). Duration is an important determinant of efficacy; however, its suitability is unknown, highlighting the need for further research (Amini et al., 2015). In this case, 16% of the studies reported 8 and 12 sessions, without indicating the exact period of the interventions. Interventions of 5-8 weeks were the most frequent (16%), followed by those of 9-12 and 13-16 weeks, both at 12%. Finally, few interventions referred to the intensity of the activities (8%), with moderate (4%) and vigorous (4%) activities being the most common. This may be because the WHO suggests incorporating moderate- and vigorous-intensity activities for the child and adolescent population (5-17 years) (WHO, 2020).

Type of Content and Activity

A total of 98.84% of the studies indicated the type of content, with procedural content being the commonest (49%), followed by attitudinal (26%) and conceptual (23%). Activities that required awareness were the most used (22%), followed by body movement (20%), knowledge acquisition, and values and emotions, (17% each). Within body movement activities, higher frequencies of motor skills (46%), body language (23%), and active rest (23%) were revealed. Some interventions indicated more than one type of content or activity, reporting a higher frequency.

Training, family involvement, and additional tasks

Half of the studies offered pre-intervention training, highlighting the importance of training the different agents involved (McCloughlin et al., 2020).

Family involvement is fundamental (Hung et al., 2015; Oberto et al., 2020). Thus, it is not surprising that almost 42% of the studies involved the family. In addition, previous research on PA and nutrition indicated the efficacy of school-based interventions by reinforcing them with a family intervention component (Hung et al., 2015; Oberto et al., 2020).

Finally, few interventions added optional tasks, 20.83%, although authors suggested the importance of adding tasks at home to reinforce family participation (McCulloch et al., 2019).

Resources

In this review, 54.17% of the studies indicated the use of some resources. Specifically, 25% were audiovisual resources, 17.86% were printed, and 7.14% were illustrations. The scant influence of the use of technology was striking, as recent studies, such as that of Langarizadeh et al. (2021), showed that technology is a fundamental tool for improving health promotion interventions.

Conclusions

The objective of this systematic review was to analyse interventions carried out in a PrE curricular setting to improve HLH in pupils.

This literature review confirms that there is no declarative framework regarding HLH dimensions in PrE. Therefore, this work offers an indicative view of the conceptual and theoretical situation of this concept, shedding light on the different dimensions through which it is being structured: PA, nutrition, emotional well-being, and hygiene. These results, on the one hand, highlight the dimensions most commonly used in the PrE curricular setting to improve pupils' HLH. It seems that both PA and emotional well-being were the pillar dimensions in PrE curricular interventions. On the other hand, these results demonstrated the lack of

HLH categorisation, which is essential for the present and future health and well-being of the population.

The studies analysed showed the preponderance of PE to improve HLH in the curricular setting. PE has always been linked in some way to health, basically, by the promotion of movement attributed to it. Even so, this review showed that HLH can also be developed and promoted in other curricular areas, such as social sciences, English, or mathematics. It is of great importance to highlight this contribution, taking into account the relationship between health and well-being and education. Pupils spend a large part of their day at school in curricular spaces, so it would be enriching to use these and others (natural sciences, artistic areas, etc.) to promote HLH.

Regarding the contents used in the interventions, despite the consideration awarded to conceptual contents, since they offer the possibility of learning more about certain concepts related to the aforementioned HLH, these were scarce; and procedural (giving importance to both the execution of actions as well as the achievement of goals) and attitudinal contents (evaluating the existing awareness of healthy behaviours) were highlighted. This study highlights the importance of awareness-raising activities; HLH require sensitisation by the student body to routinely integrate such basic functions. Pupils should be aware of the benefits and consequences that HLH can generate in the future.

Regarding the implementation of the interventions and the people participating in them, it should be noted that most of the interventions analysed included prior training and the presence of the family. It seems evident that the improvement of HLH through interventions required prior training, highlighting the importance and responsibility of the agent tasked with implementation, as well as that of the family.

Finally, based on the results, it was possible to obtain an overview of the development and implementation of HLH in the educational field. Thus, it would be of great interest that future lines of research consider the limitations of this study to advance HLH research in the PrE curriculum. On the one hand, attending to other education agents, in particular, teachers and families, would help achieve a more global vision of the interventions that should be implemented in the classroom. On the other hand, a specific content analysis of the types of activities and contents, resources used, measurement instruments, type of training, and additional tasks, would enrich the aforementioned

line of research. A more detailed view of the interventions that help improve and acquire HLH in the curricular setting would be obtained. Therefore, for future lines of research, it would be worth considering an in-depth analysis of the interventions, the elaboration of the degree of achievement of the objective, and the comparison of the variables analysed for each HLH.

Acknowledgements and funding

This study was funded by the University of Deusto (Ref: FPI UD_2022_10).

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