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Original/*Pediatría*

Effects of an intervention program (HHP) on the promotion of healthy habits in early adolescence

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Abstract

Background: **it is vital to monitor and promote healthy lifestyle habits in early adolescence, as it is a time of changes when future lifestyle habits are formed.**

Methods: **a study was conducted to find out the effects of a Healthy Habits Program (HHP) in children between the ages of 10 and 12 years (N=158). The study included an intervention group (IG) (n=90), which participated in the HHP for 8 months, and a control group (CG) (n=100). In order to assess healthy habits in these children we used the Inventory of Healthy Habits (IHH), the reliability of which was previously evaluated (N=134).**

Results: **the IHH obtained good reliability, Interclass Correlation Coefficient (range .506-884; $p<.001$) and Spearman Correlation Coefficient (range r=529-884; $p<.001$). As regards the HHP, there were no differences in eating habits initially ($p=.564$), but by the end of the study ($p=.001$) the IG showed better habits. As for the other healthy habits indicators, the CG had better habits initially ($p=.047$), but the score of the IG improved and there were no differences between the groups at the end of the study.**

Conclusions: **it was shown that the IHH is a suitable and reliable questionnaire for studying habits in adolescents. The HHP brought about changes in the IG, which achieved better scores for eating habits and sum of health habits.**

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Key words: *Early adolescence. Health. Healthy habits. Intervention. School.*

EFECTOS DE UN PROGRAMA DE INTERVENCIÓN (PHS) PARA LA MEJORA DE LOS HÁBITOS SALUDABLES EN LA PRIMERA ADOLESCENCIA

Resumen

Introducción: **la vigilancia y promoción de los hábitos de vida saludables en la primera adolescencia resulta vital, por ser una etapa de cambios y configuración de futuros hábitos de vida.**

Metodologia: **se realizaron dos estudios en niños entre 10-12 años de edad. El primero sobre la fiabilidad del Inventario de Hábitos Saludables (IHS) (N=134), y el segundo de diseño cuasi-experimental (N=158), para el estudio pre-post de los efectos del Programa de Hábitos Saludables (PHS). Los hábitos se midieron con el IHS; el grupo de intervención (GI) (n=90) participó en el PHS durante 8 meses, y el (GC) (n=100).**

Resultados: **el IHS obtuvo una buena fiabilidad, siendo el índice de correlación interclase (rango .506-884; $p<0{,}001$) y el coeficiente de correlación de Spearman (rango r=529-884; $p<.001$). Respecto al PHS, no existieron diferencias de alimentación previas (p=0,564), pero sí al final del mismo ($p=0{,}001$), a favor del GI. Del resto de indicadores de hábitos saludables, el GC tenía mejores hábitos iniciales ($p=0{,}047$), pero el GI mejoró su puntuación, no existiendo diferencias finales entre grupos.**

Conclusiones: **el IHS resultó ser un cuestionario adaptado y fiable para el estudio de los hábitos en adolescentes. El PHS provocó cambios en el GI, consiguiendo mejores puntuaciones en alimentación y sumatorio de hábitos saludables.**

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Palabras clave: *Primera adolescencia. Salud. Hábitos saludables. Intervención. Escuela.*

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Abbreviations

HHP: Healthy Habits Program.
BI: Body image.
IHH: Inventory of Healthy Habits.
SEHAN : Subscale of eating habits.
PAI: Physical activity indicator.
SLHI: Sleep habits indicator.
SLI : Sedentary lifestyle indicator.
SPI: Self-perception indicator.
ICC: Intraclass Correlation Coefficient.
SCC: Spearman Correlation Coefficient.
CG: Control group.
IG: intervention group.
SHI: Sum of Health Indicators.

Childhood overweight and obesity are a serious public health problem[1]. It is now recognized that obesity kills more people in the world than hunger[2].

The ages covered by our study (10-12 years) correspond to early adolescence. During this stage of life there are behavioral changes that have a negative effect on diet and physical activity[3], the keys to combating obesity and overweight[4], which can also be influenced by night-time sleep habits[5–7] and a sedentary lifestyle[1,8]. Self-perception of health[9] also needs to be studied, as it is related to morbidity in adulthood[10], as do self-perceived motor skills and physical condition, self-perception in general[11] and self-perceived body image (BI), which has been associated, particularly in adolescents, with health and changes in eating habits[12].

In view of the above, we present two studies in this paper, the first relating to the indicators of the Inventory of Healthy Habits (IHH), an inventory created specifically for children in this complex age group. The second relates to the Healthy Habits Program (HHP), an intervention program that, in accordance with the recommendations, seeks to make prevention the best strategy in the fight against obesity[13].

Both the Inventory and the Health Habits Program have been implemented in early adolescence, as this is the time when habits and lifestyles are acquired[14]. They are intended for use in schools, an ideal setting in which to promote strategies against overweight and obesity[15,16] and to monitor healthy habits and prevent unhealthy habits at this age[17]. The HHP also involved the schools' directors and the students' parents, as they are considered important social agents at this stage in a child's development[18].

Methodology

Study 1: Analysis of reliability of the IHH questionnaire

A total of 134 students (56.6% boys and 44.4% girls) aged between 10 and 12 years (M_{age}= 10.95; SD=.726) participated, using the test-retest method to study the reliability of the following indicators of the IHH: Physical Activity, Sedentary Lifestyle, Sleep (during the week) and Self-perception. All of them completed the indicators on two occasions, with 14 days between measurements and under the same conditions (organized into a large group, in the presence of an investigator). All of them were in the 5th or 6th year of Primary education in the Spanish education system and participated voluntarily with the authorization of their legal guardians.

Instrument

The IHH, which was created by a group of experts in Physical Activity and Sport Science, Educators and Psychologists, has text with supporting graphics, is quick to answer, self-completed and easy to use. This means that it can be administered to a large group of students at the same time, with just one tutor or person in charge.

The IHH therefore aims to reduce the limitations found in other papers when children are asked to complete questionnaires[19], which make it necessary to resort to interviewers, parents or carers providing information. This can lead to a significant loss of quality of the information obtained, depending on their knowledge of the child and the amount of time they spend with them.

The IHH comprises the following scales and indicators:

Subscale of eating habits (SEHAN). This comprises two dimensions, one relating to quality and one relating to the frequency with which foods are eaten, based on the nutritional pyramid.

This subscale was validated for a similar sample[20]. The score for its 17 items adds up to a total score ranging from 0 points to a maximum of 110 points, which denotes excellent eating habits for this age.

Physical activity indicator (PAI). This consists of 3 items with 4 possible closed answers. The first (i18) refers to the days the child does PA after school, the second (i19) to the time spent each day on PA, and the third (i20) to the days the child does PA at recess. The sum of these three answers results in the number of minutes of PA per week, including the thirty-minute recess stipulated in the primary education system in Spain (PA in min/week = i18 x i19 + i20 x 30).

Based on this result, the PAI is classified as: 1 point (PA <30 min/week); 2 points (PA ≥30 - <60 min/week); 3 points (PA ≥60 - <90 min/week); as 4 points (PA ≥90 min/week). Thus, the PAI gives a score of 3 and 4 points to those who keep to or exceed the WHO's global recommendations on physical activity for health in adolescents[21].

Sleep habits indicator (SLHI). This consists of two questions (i21 and i22) with 7 possible answers to each question. The first question asks the participants what

time they get up during the week and the second asks what time they usually go to bed. These two answers give the number of hours of night-time sleep.

Based on the number of hours of night-time sleep, the SLHI is classified as: 1 point (night-time sleep <9 hours/night); 2 points (night-time sleep ≥9 - <9.5 hours/night); 3 points (night-time sleep ≥9.5 - <10 hours/night; night-time sleep > 11 hours/night); 4 points (night-time sleep ≥10 - ≤11 hours/night).

Thus, those who sleep between 10 and 11 hours a day would obtain 4 points, as this is considered the ideal number of hours of night-time sleep for this age[5], and those who sleep for fewer than 9 hours would obtain 1 point, as they have an increased risk of suffering from excess weight[7].

Sedentary lifestyle indicator (SLI). This consists of two items, the first relating to the time spent doing cultural or educational sedentary activities (e.g. going to extra classes, reading, studying, doing homework, listening to music, etc.) and the second relating to screen-based sedentary activities (computer, television, mobile telephones, time spent on social networks, playing video games, etc.).

Both items have 4 possible answers about the time spent doing these activities. The time per day spent on sedentary activities is obtained from the sum of these two items (sedentary time in hours/day = v23 + v24).

There are few references regarding total time spent on sedentary activities[22], although most studies have found a link between BMI and a sedentary lifestyle, calculated only on the basis of hours spent in front of the screen. However, based on the results of one article regarding differences in BMI between children who spend fewer than 2 hours/day on sedentary activities and those who spend more than 4 hours/day on these activities[8], SLI was classified as: 4 points (sedentary time ≤1 hours/day); 3 points (sedentary time >1 - ≤2 hours/day); 2 points (sedentary time >2 - ≤3 hours/day); 1 points (sedentary time > 3 hours/day).

Self-perception indicator (SPI). This indicator consists of 3 items (v25, v26 and v27). The first two items of the SPI have 4 possible answers, from "very healthy" (4 points) to "ill" (1 point), and from "I never get tired" (4 points) to "I get tired right away" (1 point).

The third item on perceived body image consists of 5 silhouettes for each sex. From left to right and from thinnest to most robust, the first two silhouettes have a score of 4 points, the third 3 points, the fourth 2 points and the fifth 1 point.

The SPI is obtained by calculating the mean of the three aforementioned scores (SPI = (v25 + v26 + v27)/3).

Procedure and data analysis

To ensure that the participants understood the above-described items and the possible answers, we followed the same process as with the SEHAN[20]. It was verified that there were no difficulties in terms of clarity by administering it to a pilot group of 20 students, and after this initial check, in accordance with the recommendations, its reliability was studied using a test-retest methodology with a 14-day period between measurements. The Intraclass Correlation Coefficient (ICC) and the Spearman Correlation Coefficient (SCC) were calculated. The homogeneity of the data was assessed using the Wilcoxon test at a group level to check whether the data obtained in the test-retest were statistically different.

Study 2: Effects of the Health Habits Program

Participants

A total of 158 students (48.1% boys and 51.9% girls) with a mean age of 10.66 (.712) years from 4 schools in the Valencia Region of Spain agreed to participate in the study during the 2013-14 academic year. Informed consent was obtained from all the participants according to the ethical principles of the Declaration of Helsinki, which was revised in 2000, and Spanish legislation on clinical trials (Royal Decree 223/2004, of 6 February). All study procedures were reviewed and approved by the Valencia University Review Board.

The students were divided into a control group (CG) and an experimental or intervention group (IG) (Fig. 1), depending on their preferences and their availability to attend the program sessions. This study therefore has a quasi-experimental pretest-posttest design with a nonequivalent control group. The intervention group participated in the intervention program over 8 months. The control group continued with their daily activities without participating in the healthy habits program.

Procedure

The HHP began in October 2013 and ended in May 2014. It took place at 4 state schools in the Valencia Region in the form of a free extracurricular activity, which children from the 5th and 6th year of primary education could voluntarily enroll for.

To assess changes in the children's health habits we used the IHH, which was applied before and after the intervention for both the CG and the IG.

The HHP lasted for 8 months and was carried out by the IG in the form of two sessions per week lasting a total of 150 minutes per week. The program was also accompanied by 3 talks for parents and teachers about healthy habits for school children.

The sessions began with a brief 10-minute talk about some of the healthy habits in question, such as diet, physical activity, sleep, hygiene, dental care, etc. This was followed by a physical exercise session consisting of a 15-minute warm-up using games relating to the

topic of the initial talk, a main part lasting 40 minutes that used modified sports which provided the motivational ingredient of competition but without restrictive rules or technical demands that could exclude less able students, and a 5-minute calming down section involving another themed game. At the end of the session each student was given a worksheet designed by the investigating team about the topic explored in that session. These worksheets were signed each week by the parents/guardians of the students participating in the program and served as teaching materials for students and parents and as a link between parents and their children to support and stimulate lifestyle changes, as the students had to bring the signed sheet to the next session.

The talks for parents/guardians and teachers lasted for approximately 45 minutes and were held at the beginning of the school year and halfway through the year. The topics discussed were: Healthy habits and excess weight in children; Eating habits in school children; Diet and physical activity in children.

Data analysis

To study the effects of the HHP on healthy habits in adolescents, the descriptive statistics for the study variables were calculated at both times for both groups

The effectiveness of the HHP on the adolescents' habits was assessed using a 2 (groups) x 2 (time) mixed analysis of variance. Simple interaction effects were used to analyze the interaction effect.

Results

Study 1: Inventory of Healthy Habits health indicators

With regard to study 1 on the reliability of the health indicators, Table I shows the psychometric results for the IHH indicators and the comparative indicators for the test-retest.

It can be seen that there are no significant differences between the two measurements. The good reliability data suggest that the indicators are easily understood by the students.

Study 2: Effects of a program promoting healthy lifestyle habits.

Table II shows the descriptive results and statistics for the simple effects analysis for group (CG or IG) x time (1 or 2) and for time (1 or 2) x group (CG or IG) for each healthy habits variable that was studied.

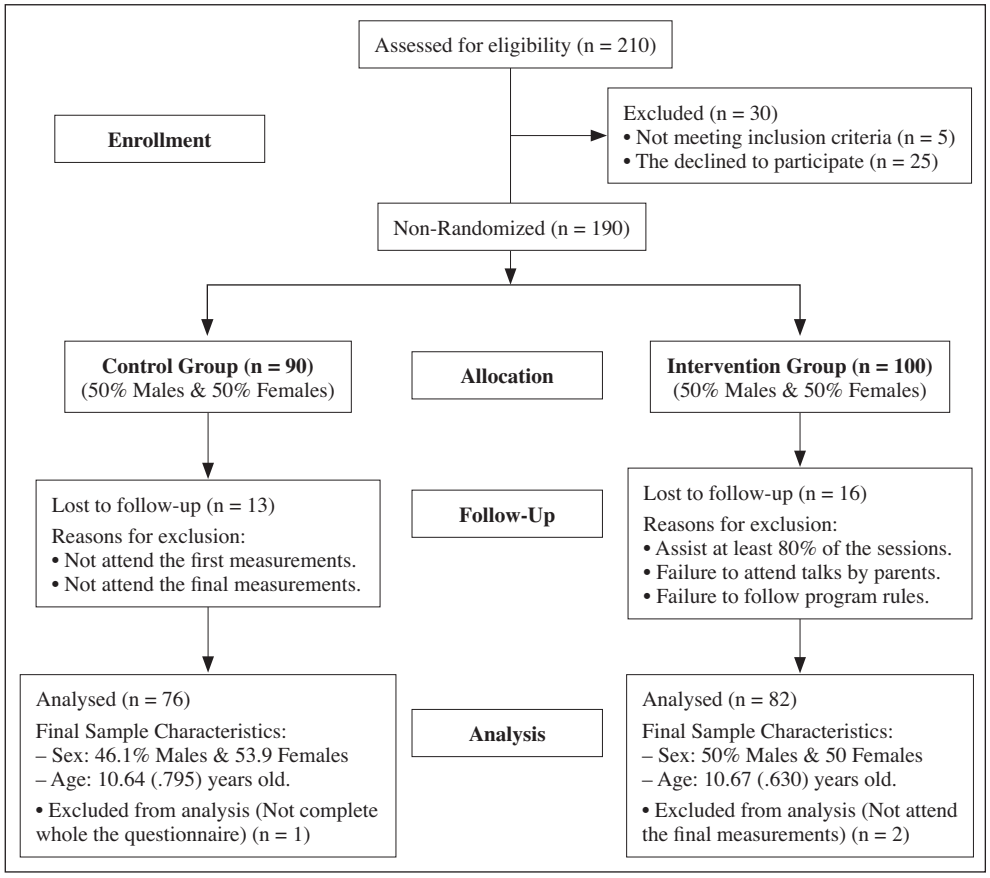

Fig. 1.—Flow diagram showing the study population and the handled during the course of your study.

As regards the overall IHH results, if we observe the SEHAN score, as seen in figure 2a, we see that there was an improvement in diet in the IG, although not significant (p>.05), and there was a significant worsening in the CG (p=.009). This means that before the HHP (time 1) there were no differences between the groups in eating habits, but these statistically significant differences (p=.001) did exist by the end of the program (time 2).

The Sum of Health Indicators (SHI) of the IHH shows that the score of the IG improved significantly (p=.004) after participating in the program, whereas there are no significant differences over time in the CG. Moreover, the differences between the groups, which

Table I
Wilcoxon homogeneity results, and Intraclass Correlation Coefficient (ICC) and Spearman Correlation Coefficient reliability results

IHH indicators	*N*	*Wilcoxon*		*ICC*	*Spearman Correlation Coefficient*
		Z	*p*		
Days of PA after school	134	.863	.388	.697**	.695**
Time spent per day on PA, games or sport	134	-.216	.829	.506**	.529**
Days per week doing PA or games at recess.	134	-.200	.841	.669**	.662**
Getting up time during the week	134	-.965	.334	.692**	.764**
Bed time during the week	134	-1.160	.246	.755**	.794**
Time spent per day on cultural or educational sedentary activities (at extra classes, doing homework, listening to music, reading, etc.)	134	-.352	.725	.551**	.542**
Time spent doing screen-based sedentary activities (television, computer, mobile telephones, or playing on other devices, etc.).	134	-1.075	.203	.696**	.697**
Perceived health	134	-1.400	.162	.688**	.720**
Perception of tiredness when doing PA, sport or games	134	-.905	.366	.731**	.746**
Perceived body image	134	-1.342	.180	.884**	.884**

IHH: Inventory of Healthy Habits
**Significant correlation between means at the 0.01 level (bilateral).

Table II
Descriptive statistics by study variable and measurement time, and the simple effects statistics of the analysis of variance, group-time and time-group by variable

Variables	*Group*	*n*	*Time 1*		*Time 2*		*F*	*p*	*Time*	*Group*	*F*	*p*
			Mean	*SD*	*Mean*	*SD*						
SEHAN	CG	76	85.75	11,411	82.72	12.189	6.938	**.009**	1	CG - IG	.334	.564
	IG	82	86.76	10.456	88.65	10.695	2.921	.089	2	CG - IG	10.576	**.001**
SHI	CG	76	10.75	1.677	10.77	1.775	.015	.904	1	CG - IG	4.006	**.047**
	IG	82	10.20	1.767	10.82	2.184	8.729	**.004**	2	CG - IG	.019	.891
PAI	CG	76	2.82	1.140	2.57	1.181	3.849	.052	1	CG - IG	7.373	**.007**
	IG	82	2.33	1.112	2.51	1.230	2.224	.138	2	CG - IG	.078	.781
SLHI	CG	76	3.04	.916	2.82	1.003	3.775	.054	1	CG - IG	.813	.369
	IG	82	2.90	.989	2.88	1.011	.048	.826	2	CG - IG	.149	.700
SLI	CG	76	2.28	.924	2.47	.935	2.491	.117	1	CG - IG	.164	.686
	IG	82	2.34	.971	2.44	.931	.744	.390	2	CG - IG	.853	.853
SPI	CG	76	2.63	.486	2.92	.606	15.366	**.000**	1	CG - IG	.015	.904
	IG	82	2.62	.513	2.99	.676	26.482	**.000**	2	CG - IG	.425	.515

Note: SEHAN: Subscale of Eating in Children; SHI: Sum of Health Indicators; PAI: Physical Activity Indicator; SLHI: Sleep Habits Indicator; SLI: Sedentary Lifestyle Indicator; SPI: Self-perception Indicator. Bold type indicates significant results.

were significant (p=.047) in favor of the CG before beginning the program, were reversed after the IG's participation in the HHP, although not significantly.

To clarify what happened with the different indicators, the effects are shown by indicator in the graph (Fig. 2 c, d, e, f).

For the PAI, although the group-time differences obtained were not statistically significant (p>.05), it can be seen that the initially significant differences (p=.007) between groups in favor of the CG were reduced and the IG obtained better scores than the CG at time 2 (p= .781).

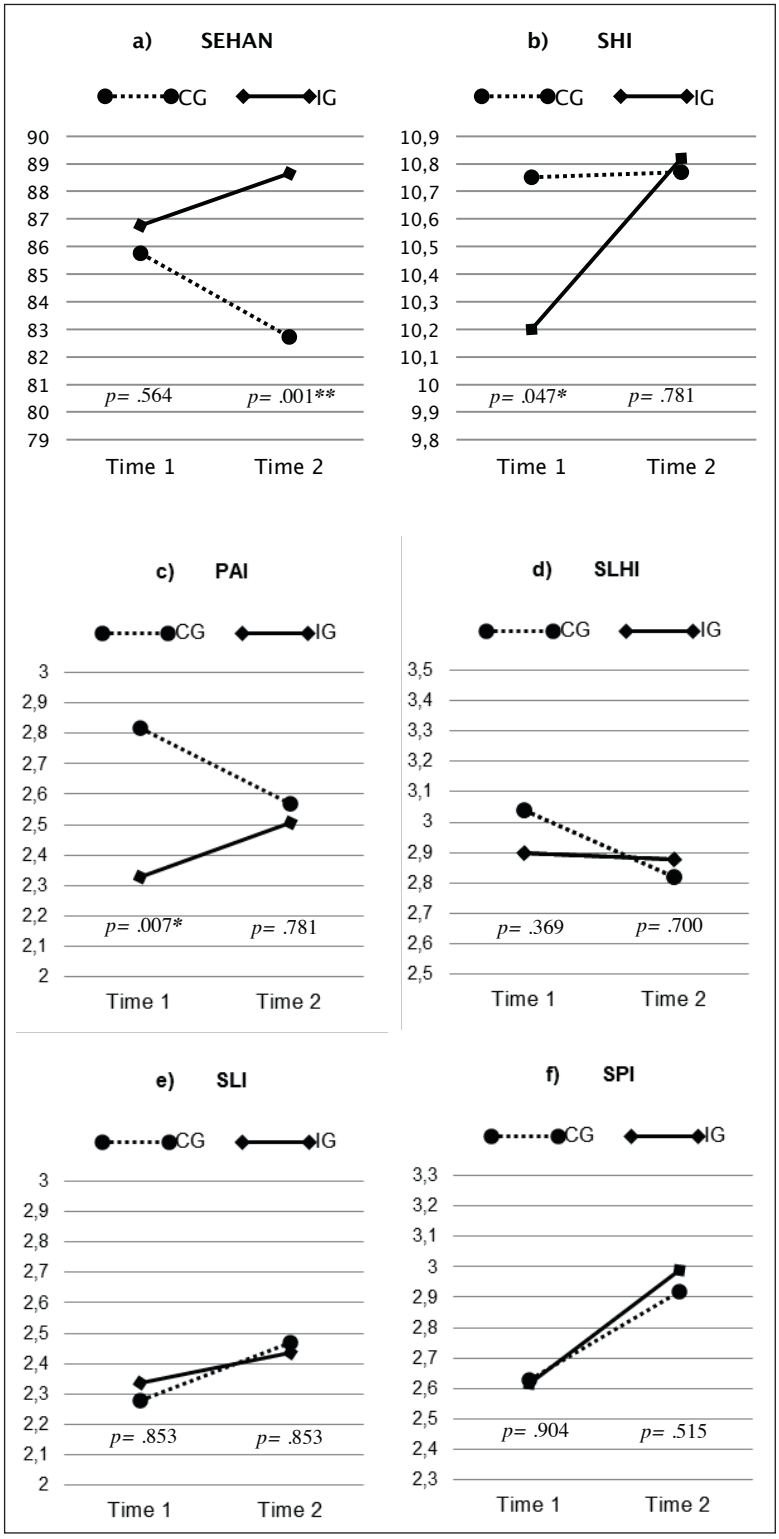

*Fig. 2.—Descriptive graphs of the simple effects by group and time for the two IHH summary variables, and simple effects by group and time for the SHI indicators. Note: SEHAN: Subscale of Eating in Children; SHI: Sum of Health Indicators; PAI: Physical Activity Indicator; SLHI: Sleep Habits Indicator; SLI: Sedentary Lifestyle Indicator; SPI: Self-perception Indicator; CG: Control Group; IG: Intervention Group; *Significant differences by group at the 0.05 level (unilateral); **Significant differences by group at the 0.01 level (bilateral).*

As regards the SPI, in both groups there was a significant improvement in self-perception score (p<.001), but there were no differences between groups at the beginning of the study (p=.904) or after the HHP (p=.515), although at the beginning of the study the self-perception score in the IG was worse in than that of the CG, and after the HHP the IG obtained better scores.

Finally, no statistically significant differences were obtained for the SLHI or for the SLI in the analysis of variance of the simple effects for group-time and time-group.

As regards hours of PA, the CG went from 1.37 (.870) hours/day at time 1 to 1.17 (.874) hours/day at time 2. And the IG went from 1.04 (.773) hours/day to 1.21 (.933) hours/day. As can be seen in Figure 3a, at time 1, 43% of the CG and 63% of the IG did not keep to the recommendation of doing more than 60 minutes of PA per day. After the program 55% did not keep to the recommendations regarding PA in both groups.

As regards hours of sleep, this figure ranged between 9.5 and 9.7 hours/night. Only 8% of the CG and 10% of the IG slept for fewer than 9 hours per day at time 1. However, at time 2, 13% of the CG and 16% of the IG stated that they slept for fewer than 9 hours (Fig. 3b).

With regard to total hours of sedentary activities per day, this figure remained between 2.23 (.780) hours/day and 2.04 (.740) hours/day. At time 1, only 34% in the CG and 43% in the IG spent fewer than 2 hours per day doing sedentary activities. However, at time 2, both groups improved slightly and 43% of the CG and 48% of the IG spent fewer than two hours doing these activities (Fig. 3c).

Discussion

Changes that take place in the brain and particularly in the limbic system during adolescence result in increased risk-taking, greater vulnerability to environmental factors[23] and progressive independence (vertical influence), which makes it necessary to monitor healthy lifestyle habits using questionnaires specifically designed for this age group.

And as this stage is characterized by a process of greater brain plasticity, it is also a favorable age for intervention[23], since it is during adolescence that habits and lifestyles are acquired[14], forming our adult lifestyle.

Study 1: Inventory of Healthy Habits health indicators

The IHH is a tool created for studying and monitoring habits such as diet, physical activity, sleep, sedentary activities, self-perceived health, self-perceived physical condition and self-perceived body image, all variables that have previously been related to overweight, obesity and health in general for adolescents and/or children[5,8,10].

Following the same methodology as with the SEHAN, the validated part of this inventory of healthy habits[20], the psychometric results obtained using the test-retest method with 14 days between measurements[20,24] show that, according to the Wilcoxon signed-rank test, there were no differences in homogeneity in the test-retest (p>.05) for any of the items of the health indicators.

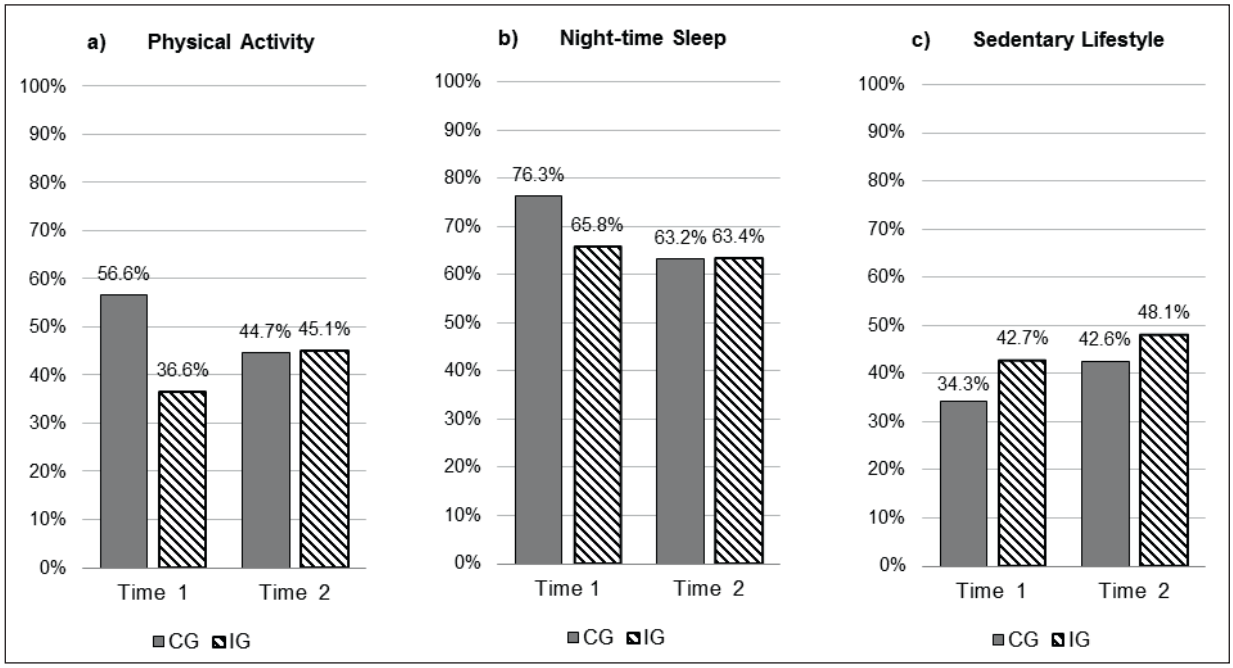

Fig. 3.—Descriptive graph of the percentage of the study population that followed the recommendations regarding physical activity, night-time sleep and sedentary activities, by group and measurement time. CG: Control Group; IG: Intervention Group.

According to the existing classifications[25], the ICC obtained (range .506 – 884; p<.001) was moderate to excellent and the SCC results (range r= 529 – 884; p<.001) confirmed the good reliability of the items in our indicators.

Therefore, despite being self-administered, the reliability of the IHH is good, which shows that school children understand the instrument. It is a short, simple questionnaire with graphics to support the text, which helps avoid the typical limitations pertaining to this age group, such as "not recognizing food groups", "insufficient vocabulary" or "loss of attention" due to lack of fun components[19]. The IHH is also in line with the characteristics of adolescents and a school setting, and it can be administered to a large group in the presence of one carer, making it viable both economically and in terms of the resources required, which Aranceta-Batrina et al.[26] describe as essential aspects in this type of studies.

Study 2: Analysis of the effects of a program promoting healthy lifestyle habits

In Spain, the rate of excess weight between the ages of 8 and 13 is approximately 45% according to WHO criteria[27], making it necessary to develop programs like ours, based on physical exercise and food education as key elements for preventing and treating excess weight at early ages[28].

The purpose of this program, in line with other studies[29], involved creating healthy environments and we make use of the school setting, parents, teachers and friends to create a more motivating climate[15,16,18].

Eating habits. As expected[30], eating habits worsened significantly in the CG. However, participants in the Healthy Habits Program report a slight improvement in eating habits.

These different trends in the two groups meant that at the end of the Program the eating habits of the participating students were significantly better than those of the CG.

Health indicators. The sum of health indicators shows that the CG's score practically remained the same after 8 months, whereas the IG's score improved considerably. This means that the differences observed at the beginning of the academic year, when the CG was significantly better, were reduced and were no longer significant after the IG participated in the Program.

When the health indicators are analyzed individually, it can be seen that the greatest effects occur with physical activity.

Physical activity. As regards physical activity, the level of physical activity decreased in the CG, as described by Veigh Mc and Meiring[8], who state that physical activity decreases each year during adolescence.

On the other hand, in the IG the amount of PA increased during the school year, reaching 1.21 hours/day of PA after the program. These opposite trends mean that the IG, which started with lower levels of PA (p=.007), reached almost the same levels as the CG by the end of the academic year (p=.891).

If we compare our data to those of another study carried out in Spain by Villagrán-Pérez, et al.[31] in children between the ages of 6 and 12 in Cadiz, in which the amount of PA was 1.23 hours/day with a percentage who followed the recommendations of 55.9%, we see that their levels of PA are slightly higher than ours. From our point of view and in line with the recommendations[24], we believe it is worrying that by the end of the program only 44.7% of the children in the CG and 45.1% of those in the IG were doing 60 minutes or more of physical activity per day.

Self-perception. The SPI shows a clear and significant increase (p<.001) in both groups, although no differences were observed between the groups. However, the IG, which had a lower score than the CG before the program, achieved a higher score by the end of it. This may be because the emotional, family-oriented, fun atmosphere of the program could be influencing their health perception due to positive experiences at school[32] and doing physical activity[33].

Sleep. The SLHI shows a slight decrease in the score in both groups, which may be because they need less sleep as they get older[34], and there were no differences in terms of time or group for this variable. However, the mean number of hours of night-time sleep obtained in this study (9.5 – 9.7 hours/night) are quite a lot higher than the 9 hours of night-time sleep below which the risk of excess weight increases[7] and closer to the 10 or more hours described by Stone et al.[35], which correlated with more physical activity. In our sample, only 8% of the CG and 10% of the IG in the first measurement and 13% of the CG and 16% of the IG in the second measurement slept for fewer than 9 hours/night.

If we compare the number of hours of sleep with other children aged 9 and 10, it can be seen that they slept for 9.5 hours/night[6], and in another study where the number of hours of sleep were calculated in white children between the ages of 7 and 17, the mean was 9.64 hours/night[8].

Sedentary lifestyle. Both groups experience a slight improvement in terms of sedentary activities, according to the SLI. However, in both the first and the second measurement, the students spent 2 hours of sedentary activity per day. The total sedentary time ranged between 2.04 and 2.23 hours/day, and by the end of the program 42.6% of the CG and 48.1% of the IG kept to the set recommendation of fewer than 2 hours per day in total spent on sedentary activities.

If we compare the number of hours of sedentary activity with other studies using self-report questionnaires in children of a similar age[6], obtained a total of 3.42 hours/day of sedentary time (including hours of TV, video games and computer), which is considerably more than our data, as we cover more sedentary acti-

vities (such as doing homework, reading or listening to music). For their part, with the limitation described above, Villagrán-Pérez, et al.[31] obtained a mean sedentary time of 2.21 hours/day, with 51% of the children keeping to the recommendation of fewer than two hours of sedentary activities. Like other authors[22], we believe that the total sedentary time should be investigated and should not be limited only to time watching a screen.

Conclusions

In this study, school was shown to be a key place for monitoring healthy habits in adolescents and for implementing health promotion interventions.

The IHH proved to be a reliable, fast and viable instrument for studying and monitoring healthy habits in early adolescence.

Thanks to the HHP the IG improved in terms of eating habits and physical activity, which are key elements of a healthy lifestyle. This shows that healthy lifestyle habits in adolescents are controllable and improvable, even in a relatively short period of time, despite this being a stage of life that is characterized by major changes, progressive independence and increased risk-taking

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