Pilot testing the effectiveness of the Healthy Ageing Supported by Internet and Community programme for promoting healthy lifestyles for people over 65 years of age

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Active ageing is associated with physical, social and mental wellbeing, as well as the participation and integration of older people in society. Currently, demographic changes represent a major challenge while reinforcing the need to improve our current understanding of active ageing and promote appropriate interventions suitable for older people. The aim of this pilot study was to evaluate the impact of the *Healthy Ageing Supported by Internet and Community* training programme for acquiring the knowledge and skills necessary for adopting a healthy lifestyle in community-dwelling adults over 65 years of age. This study was conducted between 2015 and 2016 and was based on a convenience sample of individuals who responded to questionnaires. The study participants

comprised all those who were included in the training programme (n = 71, 47 mentors and 24 participants in peer groups). The statistical analysis demonstrated the effectiveness of the programme regarding feasibility and expected results ($p < 0.05$ for most items, individually, as well as for the total scores of each test dimension). The programme was based on peer group training and the use of information and communication technologies and proved to be effective for acquiring the knowledge and skills necessary for adopting a healthy lifestyle. Furthermore, increased health scores were obtained in the physical, mental and social domains. It could also be beneficial for other groups of older people in order to support their integration into society, enhance their social skills and decrease any feelings of loneliness and rejection.

Keywords: clinical effectiveness, health promotion, older people, public health nursing, quantitative approaches.

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Introduction

According to the World Health Organization (WHO), it is estimated that there will be 1.2 billion people over the age of 60 worldwide in 2025, reaching two billion in 2050 (1). In the case of older people over the age of 80, it is anticipated that there will be an increase of 57.1% in 2030 compared to 2010 (2). The same trend is also observed in Spain which, by 2050, will have one of the

highest populations of older people globally; in 2052, it is estimated that 37% of the Spanish population will be over 65 years of age (3). These demographic changes represent a major challenge that highlights both the necessity of improving our current understanding of active ageing (4), as well as promoting interventions that promote and foster the same (5).

Active ageing has been defined as being the process of optimisation of health opportunities, participation and security with the purpose of improving the quality of life of people as they age. This concept is associated with physical, social and mental wellbeing and the overall participation and integration of older people into society (6–8). The objectives of active ageing are to obtain the highest standards of health, wellbeing, quality of life and

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social development considering, not only the physical and intellectual potential of older adults, but also the opportunities made available by the local community and society (1). Regarding the latter, society plays a key role in this process, in that it should aim to integrate older people, rather than being indifferent to them (9). Previous studies have shown the benefits of active ageing in the reduction of mortality in adulthood, as well as contributing towards enhancing individual wellbeing. Other advantages, such as financial and social benefits, have also been reported (5,8,10).

At present, there are numerous interventions aimed at the promotion of worldwide active ageing. These interventions include the development of health systems which are more sympathetic towards older people via actively promoting good health, disease prevention and programmes aimed at fostering higher quality long-term care (6,11,12). There is also an increasing number of specific international associations and initiatives concerned with actively developing their own active ageing programmes focused on promoting good health (7,13). Some of the more successful of these include the *Vital Ageing Program*, which uses the multimedia and e-Learning (6); *The California Active Ageing Community Grant Program*, who promote the use of mobile phones (3); and *The Optimal Ageing Program*, characterised by the intergenerational nature of the same (11). In general, the interventions used for promoting active ageing are focused on the following domains: metabolic and physiological health, physical ability, cognitive function, psychological comfort and social welfare.

Although initiatives regarding active ageing may be carried out individually or in groups (11,14), it is well known that it is up to the individual to make decisions regarding their own lifestyle in order to actively age (15). Previous studies have highlighted the importance of appropriate health education with regards active ageing taught by professionals, as well as the implementation of suitable prevention programmes (16). Moreover, in recent years, one of the most important innovations regarding proposed interventions for promoting active ageing is the use of both the Internet and digital technologies. Information and communication technologies (ICTs) are a significant source of information for people of all ages (16,17). This resource can be widely accessed and adapted to specific communities (18,19), resulting in numerous health benefits, as well as psychosocial benefits. Furthermore, this technology can be specifically applied to active ageing initiatives (20–22). In this sense, the European Union's Digital Agenda 2020 proposed taking advantage of the ITC potential to contribute to active aging and implement interventions aimed at dispelling the myth that older people are not interested in new technologies (5). Although ITCs offer important possibilities for the promotion of active ageing (8), previous

studies have stressed the need for further research in this field, as well as designing online programmes adapted to the needs of older people (23,24). In this sense, we know that age-related changes in functionality should be considered when designing programmes for older people (7).

Within this framework and based on survey results, it is important to note the limitations of existing interventions in order to create more specific techniques focused on the promotion of active ageing (25). The programme featured in this study was established for this purpose and was included in the European project known as the *Healthy Ageing Supported by Internet and Community programme (HASIC)*. This project aims to develop tools to promote the participation of older people in community activities, supported by peer groups and the use of ICTs (specifically the Internet) with the purpose of improving physical and mental health, as well as the overall wellbeing, of older people living in the community (26).

Aim

The aim of this pilot study was to evaluate the impact of the *Healthy Ageing Supported by Internet and Community training programme* for acquiring the knowledge and skills necessary for a healthy lifestyle in community-dwelling adults over 65 years of age. A priori, our hypothesis was that the HASIC training programme would be effective for acquiring the knowledge and skills necessary for adopting a healthy lifestyle among older people.

Methods

We conducted a before-and-after study to pilot test the feasibility and initial impact of the HASIC training programme for the empowerment and promotion of healthy lifestyles in community-dwelling adults over 65 years of age. This study was the Spanish phase of a multiphase HASIC study, comprising several European countries, to develop a preliminary understanding of the benefits of empowering older people to adopt healthy lifestyles.

We used a convenience sample which involved all participants in the HASIC training programme at Talavera de la Reina and Cuenca, Spain. The HASIC programme is a project funded by the Health Programme of the European Union (Reference: 20131 206859172), led by the University of Applied Sciences of Turku, Finland. Seven European countries participated in the project: Finland, Norway, Estonia, Germany, the Netherlands, Spain and Hungary. The project's objective was to educate Europeans aged over 65 regarding adopting a healthy lifestyle that encompasses a healthy diet, regular physical activity, moderate alcohol consumption and social participation.

Intervention design

Three phases were conducted to encourage the empowerment of older people in healthy lifestyles.

1 Courses for mentors

First, educational interventions were designed for professionals and students in the fields of social and health-care working with older people, and for voluntary older people in the community. These individuals acted as peer group mentors. The educational activities were aimed at updating the participants' knowledge regarding active ageing and healthy lifestyle habits promoted by HASIC, as well as training the participants to lead peer groups. During the theoretical-practical sessions, the participants learned training skills related to the recognition of health hazards in older people and how to support the empowerment and self-management of a group of people over 65 years of age. Details of training programmes for mentors can be found in Fig. 1.

2. Peer group activities

After the training courses for mentors, training activities were performed for peer groups (older people living in communities at a risk of health loss or exclusion). These activities were led by the mentors (professionals, students and motivated older people) who had previously received the training courses for mentors. In these training sessions, the participants analysed the health risks and other challenges for ageing populations. They shared their experiences and learned from each other. The peer group sessions were based on a practical handbook, which was written in cooperation with all partner countries of the HASIC project, and included activities focused on the promotion of active ageing and healthy lifestyles in older people (healthy diet, physical activity, moderate alcohol consumption and social participation). These sessions were conducted after the initial training activities (26). The structure of the working domains, as well as the activities performed, is shown in Fig. 2.

3. Online platform to support healthy lifestyles

Finally, the activities of this project were reported via a user-friendly online platform created in cooperation with older people (<http://www.hasicplus.eu/>), and which included tools, videos, chat-forum and practical information for self-assessment and health self-monitoring in older people, plus an organised programme for behavioural change. The content of the online platform was consistent with the approach and content of the handbook (26). This platform was available online free of charge for all participants.

Sample and settings

In Spain, this project was led by the University of (blinded) and was implemented at the (blinded) day centre in Cuenca and at the (blinded) Community Council Day Centre in Talavera de la Reina. In Cuenca, a group of 36 healthcare students participated, while 11 people, aged over 65, comprised the peer group. In Talavera de la Reina, a group of 11 mentors was formed, together with a peer group comprising 13 older people.

The convenience sample included all the participants who were expected to complete the training activities of the HASIC Project in Cuenca and Talavera de la Reina. The final sample consisted of 71 participants, that is 47 professionals, students and mentors and 24 older people participating in the peer groups. The following inclusion criteria was used for the selected sample: participants had to be employed in social or health services for older people living in the community in the municipalities of Talavera de la Reina or Cuenca. In the case of the older people, the participants had to be (1) at least 65 years old; (2) living in community; (3) service users at the day centres where the participants were recruited; (4) retired or having taken early retirement; and (5) participants were not considered too fragile, according to the Fried phenotype of frailty criteria (27). The exclusion criteria for both the professionals and the older participants were the failure to complete the project's training activities.

Week		Pre-test	1	2	3	4	5	6	7	8	9	10	Post-test
Contents	General information on the project		X										
	Preconditions, goals, content, activities, planning, materials and evaluation.			X	X	X							
	Training skills: Didactics						X	X					
	Training Skills: Group Dynamics								X	X			
	Starters and Energisers/ Roadmap of a Session										X	X	

Figure 1 Summary of the training programme for mentors.

Week			Pre-test	1	2	3	4	5	6	7	8	9	10	Post-test
Contents	Physical Health	Physical exercise		X		X								
		Preventing home accidents			X									
		Drinking				X								
		Food				X								
	Social Health	Preventing loneliness					X					X		
		Avoiding depression				X		X						
		Social Network							X	X				
		Social Participation							X	X				
	Emotional and Mental Health	Self-esteem and autonomy			X						X			
		Resilience										X		
		Believing in the future					X						X	

Figure 2 Summary of the training programme for peer groups.

Data collection

The data were collected using ad hoc questionnaires which the participants completed before and after the training intervention. Interventions began in November 2015, and the study was completed in February 2016.

Two ad hoc questionnaires were prepared in order to help guide the development and implementation of the training activities of the project and to verify the preliminary effectiveness and feasibility of the programme. One of these was designed for the older mentors, students and professionals, while the other was aimed at those older people who had participated in the peer group sessions. Both questionnaires were completed both before and after participation in the HASIC programme.

The questionnaires for mentors were geared towards the implementation of the activities, as well as both improving the understanding of the operational aspects of the project and obtaining an initial evaluation of the effectiveness of the activities included in the process. These questionnaires included the profile of the mentor (i.e. health professional, university student or voluntary older person), as well as other sociodemographic variables (age, sex and location). The main sections or dimensions of the questionnaires evaluated the grade of knowledge regarding the physical, social and mental health of older people, and their skills and leadership attitudes. Each section comprised three items which were evaluated using a Likert-type rating scale with four levels 1–4. A response of 1 means a poor knowledge or domain, 2 normal, 3 good and 4 excellent. Finally, we included two open questions concerning what the participants hoped to learn and a space for their comments regarding the questionnaire. This questionnaire was carried out before and after the intervention. The only difference between both questionnaires is that the second one

included a space for the participants' opinion on what they had learned from the project, their recommendations for introducing this programme to someone else and possible changes in order to improve the programme. Additionally, the participants used this space to comment on whether they felt that what they had learned was useful in the community.

As in the questionnaire for mentors, an ad hoc questionnaire was prepared for the participants of the training session before and after participating in the peer groups. In addition to gathering sociodemographic data of the participants, such as sex and age, these questionnaires sought to assess whether the older participants had ultimately acquired the knowledge and skills necessary for adopting a healthy lifestyle after participating in the programme. In the questionnaire completed prior to the training, three main sections, or dimensions, were evaluated: the participant's physical health, mental health and social wellness, with three items per dimension or section. Each response was collected using a Likert-type scale rated from 1 to 4, where 1 implies a poor knowledge or domain, whereas 4 means excellent performance. At the end of this questionnaire, two open questions were included, requesting the participants' opinion regarding what they expected from the group activities and whether they had any additional comments. This questionnaire was also completed after the training, adding open questions about how the person expected to change their habits concerning physical and mental health, social wellbeing and their relationships. In addition, they were asked whether they would recommend these activities to someone else. To enable the subsequent pairing of the questionnaires performed pre- and postintervention, each questionnaire was assigned an identifying number. This ensured that the personal data of the participants were treated

with the strictest confidentiality, according to current Spanish legislation.

The validity and reliability (internal consistency) of both questionnaires were evaluated. The factorial analysis showed that three and five dimensions explained 67% and 74% of the variance for the peer group test and the mentor group test, respectively. Both questionnaires showed positive results in terms of internal consistency (Cronbach's alpha = 0.6 and 0.76 in the peer group test

and mentor group test respectively). In preliminary studies, values of between 0.5 and 0.6 are considered acceptable for this reliability measure (27).

Data analysis

The software used for both the data processing and statistical analysis was the SPSS Statistics 19 (Statistical Package for Social Science) for Windows. A descriptive analysis was performed with the collected data. The Wilcoxon signed-rank test was used to evaluate whether the median scores significantly differed before and after the intervention. Nonparametric tests are the most recommended in the literature for ordinal data (28). Moreover, the Shapiro–Wilk test was performed confirming the non-normality of the observation distribution (see Tables 1 and 2). The significance level was defined at $p < 0.05$ for all statistical testing.

It was assumed that the HASIC programme would be effective for acquiring the knowledge and skills necessary for adopting a healthy lifestyle; thus, the achieved scores in the baseline questionnaire (or pre-intervention) would be lower than the scores achieved in the postintervention questionnaire.

Table 1 Normality test results of the questionnaire items of the mentoring group

	Kolmogorov–Smirnov			Shapiro–Wilk		
	Statistic	f.d.	Sig.	Statistic	f.d.	Sig.
A01 Pre	0.389	47	0.000	0.694	47	0.000
A02 Pre	0.353	47	0.000	0.738	47	0.000
A03 Pre	0.299	47	0.000	0.748	47	0.000
B01 Pre	0.442	47	0.000	0.607	47	0.000
B02 Pre	0.329	47	0.000	0.765	47	0.000
B03 Pre	0.279	47	0.000	0.799	47	0.000
C01 Pre	0.322	47	0.000	0.767	47	0.000
C02 Pre	0.255	47	0.000	0.799	47	0.000
C03 Pre	0.309	47	0.000	0.778	47	0.000
D01 Pre	0.381	47	0.000	0.683	47	0.000
D02 Pre	0.359	47	0.000	0.693	47	0.000
D03 Pre	0.271	47	0.000	0.778	47	0.000
E01 Pre	0.329	47	0.000	0.793	47	0.000
E02 Pre	0.311	47	0.000	0.728	47	0.000
E03 Pre	0.319	47	0.000	0.752	47	0.000
A01 Post	0.370	47	0.000	0.689	47	0.000
A02 Post	0.343	47	0.000	0.666	47	0.000
A03 Post	0.388	47	0.000	0.660	47	0.000
B01 Post	0.388	47	0.000	0.623	47	0.000
B02 Post	0.413	47	0.000	0.656	47	0.000
B03 Post	0.366	47	0.000	0.633	47	0.000
C01 Post	0.484	47	0.000	0.504	47	0.000
C02 Post	0.333	47	0.000	0.755	47	0.000
C03 Post	0.355	47	0.000	0.635	47	0.000
D01 Post	0.410	47	0.000	0.609	47	0.000
D02 Post	0.413	47	0.000	0.656	47	0.000
D03 Post	0.370	47	0.000	0.689	47	0.000
E01 Post	0.355	47	0.000	0.635	47	0.000
E02 Post	0.324	47	0.000	0.698	47	0.000
E03 Post	0.366	47	0.000	0.633	47	0.000
Total A Pre	0.462	47	0.000	0.489	47	0.000
Total B Pre	0.397	47	0.000	0.677	47	0.000
Total C Pre	0.351	47	0.000	0.725	47	0.000
Total D Pre	0.381	47	0.000	0.683	47	0.000
Total E Pre	0.307	47	0.000	0.727	47	0.000
Total A Post	0.413	47	0.000	0.656	47	0.000
Total B Post	0.432	47	0.000	0.588	47	0.000
Total C Post	0.474	47	0.000	0.525	47	0.000
Total D Post	0.421	47	0.000	0.599	47	0.000
Total E Post	0.344	47	0.000	0.637	47	0.000

Lilliefors correction.

Table 2 Normality test results of the questionnaire items of the peer group

	Kolmogorov–Smirnov			Shapiro–Wilk		
	Statistic	f.d.	Sig.	Statistic	f.d.	Sig.
A01 Pre	0.389	24	0.000	0.700	24	0.000
A02 Pre	0.281	24	0.000	0.800	24	0.000
A03 Pre	0.464	24	0.000	0.542	24	0.000
B01 Pre	0.369	24	0.000	0.717	24	0.000
B02 Pre	0.464	24	0.000	0.542	24	0.000
B03 Pre	0.274	24	0.000	0.806	24	0.000
C01 Pre	0.285	24	0.000	0.801	24	0.000
C02 Pre	0.233	24	0.002	0.839	24	0.001
C03 Pre	0.427	24	0.000	0.622	24	0.000
A01 Post	0.379	24	0.000	0.629	24	0.000
A02 Post	0.503	24	0.000	0.454	24	0.000
A03 Post	0.244	24	0.001	0.841	24	0.001
B01 Post	0.292	24	0.000	0.688	24	0.000
B02 Post	0.344	24	0.000	0.722	24	0.000
B03 Post	0.336	24	0.000	0.640	24	0.000
C01 Post	0.248	24	0.001	0.822	24	0.001
C02 Post	0.243	24	0.001	0.785	24	0.000
C03 Post	0.533	24	0.000	0.316	24	0.000
Total A Pre	0.348	24	0.000	0.751	24	0.000
Total B Pre	0.464	24	0.000	0.542	24	0.000
Total C Pre	0.255	24	0.000	0.827	24	0.001
Total A Post	0.519	24	0.000	0.393	24	0.000
Total B Post	0.276	24	0.000	0.697	24	0.000
Total C Post	0.309	24	0.000	0.763	24	0.000

Lilliefors correction.

Results

Results of the training sessions for future mentors

In total, 47 people participated in the training sessions for mentors on the HASIC programme. Among other sociodemographic data, the mentor's profile (student/professional/older volunteer) and their city of residence (Cuenca/Talavera de la Reina) were collected from the participants in the mentoring training. Of the 47 mentors, there were 77% females and 23% males. This comprised 36 healthcare students from Cuenca and 11 older volunteers from Talavera de la Reina. The average age of participants from Cuenca was 22.56 (± 2.95) years old, whereas those from Talavera were aged 70.82 (± 2.79) years old. Previous data are included in terms of the sample mean ($\pm$ sample standard deviation). Due to the differences between the profiles of the mentors, depending on the location, the average age was 33.85 (± 20.64) years old considering all the mentor participants.

For the descriptive analysis, we collected measures of central tendency of the items before and after completing the training programme (Tables 3 and 4), where $\bar{x}$ P_{50} denotes the mean and the median of the scores, respectively. The median represents the 'middle' value of a data sample, or the value which separates the higher half from the lower half of the data. Additionally, the

standard deviation (SD) was included as a measure of data dispersion or variability. A new summary variable was created for each dimension, according to the median scores of each participant for each group of items. These variables equal a global measure of each test dimension. Descriptive statistics of the summary variables were also included in Tables 3 and 4 for the mentoring group before and after training, respectively.

A letter was assigned to each dimension to indicate the membership group of each item: (A) physical health, (B) mental health, (C) social health, (D) leadership skills and (E) leadership attitudes. In addition, an identifying number was allocated to each item, in order, together with the group that it belonged to.

Tables 3 and 4 showed significant differences in the distribution of the scores before and after the intervention in dimensions A (physical health), B (mental health), C (social health) and D (leadership skills). Regarding the mean scores and considering the median as the most representative measure of central tendency for ordinal data, we found higher values postintervention. In particular, P_{50} increased from 2.00 to 3.00 in the total scores of the previously mentioned dimensions. A standard deviation of approximately 0.5 is indicative of a consolidated response. Nevertheless, in section E (leadership attitude), the median remained constant ($P_{50} = 3.00$) although the mean scores were higher in the questionnaire postintervention.

Table 3 Characteristics associated with the questionnaire items prior to the training of the mentoring group

Items		$\bar{x} \pm SD$	P_{50}
Physical health	A01 Pre. How do you evaluate your knowledge about physical health in nutrition?	2.11 $\pm$ 0.52	2.00
	A02 Pre. How do you evaluate your knowledge about physical health in physical activity?	1.94 $\pm$ 0.57	2.00
	A03 Pre. How do you evaluate your knowledge about physical health in drinking habits?	1.84 $\pm$ 0.61	2.00
	Total score of A dimension	1.96 $\pm$ 0.36	2.00
Mental health	B01 Pre. How do you evaluate your knowledge about mental health in attitude towards life?	2.13 $\pm$ 0.45	2.00
	B02 Pre. How do you evaluate your knowledge about mental health relating to the possibility of making decisions about your life?	2.06 $\pm$ 0.60	2.00
	B03 Pre. How do you evaluate your knowledge about mental health relating to self-esteem?	2.02 $\pm$ 0.62	2.00
	Total score of B dimension	2.09 $\pm$ 0.50	2.00
Social health	C01 Pre. How do you evaluate your knowledge about social health relating to loneliness?	2.13 $\pm$ 0.45	2.00
	C02 Pre. How do you evaluate your knowledge about social health relating to depression?	1.83 $\pm$ 0.63	2.00
	C03 Pre. How do you evaluate your knowledge about social health relating to social networks?	2.00 $\pm$ 0.67	2.00
	Total score of C dimension	2.00 $\pm$ 0.55	2.00
Leadership skills	D01 Pre. How do you evaluate your group leading/mentoring skills relating to motivating group participants?	2.34 $\pm$ 0.52	2.00
	D02 Pre. How do you evaluate your group leading/mentoring skills relating to promoting interaction with participants?	2.38 $\pm$ 0.53	2.00
	D03 Pre. How do you evaluate your group leading/mentoring skills relating to leading the dialogue with the group participants?	2.30 $\pm$ 0.62	2.00
	Total score of D dimension	2.34 $\pm$ 0.52	2.00
Leadership attitudes	E01 Pre. How do you evaluate your group leading/mentoring attitude relating to open mindedness?	2.60 $\pm$ 0.54	3.00
	E02 Pre. How do you evaluate your group leading/mentoring attitude relating to supportive attitude?	2.60 $\pm$ 0.58	3.00
	E03 Pre. How do you evaluate your group leading/mentoring attitude relating to creativeness?	2.38 $\pm$ 0.71	3.00
	Total score of E dimension	2.57 $\pm$ 0.58	3.00

Table 4 Characteristics associated with the questionnaire items after the mentoring group training

Items		$\bar{x} \pm SD$	P_{50}
Physical health	A01 Post. How do you evaluate your knowledge about physical health in nutrition?	3.36 ± 0.53	3.00
	A02 Post. How do you evaluate your knowledge about physical health in physical activity?	3.32 ± 0.59	3.00
	A03 Post. How do you evaluate your knowledge about physical health in drinking habits?	3.04 ± 0.62	3.00
	Total score of A dimension	3.28 ± 0.50	3.00
Mental health	B01 Post. How do you evaluate your knowledge about mental health relating to attitude towards life?	3.40 ± 0.50	3.00
	B02 Post. How do you evaluate your knowledge about mental health relating to the possibility of making decisions about your life?	3.28 ± 0.35	3.00
	B03 Post. How do you evaluate your knowledge about mental health relating to self-esteem?	3.45 ± 0.50	3.00
	Total score of B dimension	3.32 ± 0.47	3.00
Social health	C01 Post. How do you evaluate your knowledge about social health relating to loneliness?	3.21 ± 0.41	3.00
	C02 Post. How do you evaluate your knowledge about social health relating to depression?	3.23 ± 0.60	3.00
	C03 Post. How do you evaluate your knowledge about social health relating to social networks?	3.53 ± 0.50	4.00
	Total score of C dimension	3.23 ± 0.43	3.00
Leadership skills	D01 Post. How do you evaluate your group leading/mentoring skills relating to motivating group participants?	3.36 ± 0.49	3.00
	D02 Post. How do you evaluate your group leading/mentoring skills relating to promoting interaction with participants?	3.28 ± 0.50	3.00
	D03 Post. How do you evaluate your group leading/mentoring skills relating to leading the dialogue with the group participants?	3.36 ± 0.53	3.00
	Total score of D dimension	3.34 ± 0.48	3.00
Leadership attitudes	E01 Post. How do you evaluate your group leading/mentoring attitude relating to open mindedness?	3.47 ± 0.50	3.00
	E02 Post. How do you evaluate your group leading/mentoring attitude relating to supportive attitude?	3.47 ± 0.55	3.00
	E03 Post. How do you evaluate your group leading/mentoring attitude relating to creativeness?	3.45 ± 0.50	3.00
	Total score of E dimension	3.49 ± 0.50	3.00

Figure 3 Distribution of total scores of each dimension before-and-after training for mentoring group.

The boxplots depicted in Fig. 3 visually support the above results. In summary, we inferred that the grade of knowledge of all dimensions increased from 2.19 to 3.33 points

in the total mean scores when considering all the dimensions combined.

Results of the peer group intervention

In the case of the peer groups, 24 people aged over 65 completed the training sessions. The sociodemographic variables included in the questionnaires were the city where the intervention took place (Cuenca/Talavera de la Reina), the gender and the age. In this case, there were 13 participants from Cuenca and 11 from Talavera de la Reina. The total sample comprised 17% females and 83% males. The average age was $69.45 (\pm 3.01)$ years old.

Analogous to the questionnaires of the group of mentors and professionals, we computed the mean ($\bar{x}$), median (P_{50}) and standard deviation (SD) of the scores obtained before and after the HASIC programme intervention for older people (Tables 5 and 6, respectively). (A), (B) and (C) denote the same dimensions as the previous case. Tables 5 and 6 showed that physical and mental health dimensions increased one point in the total median scores after the intervention, whereas social wellness only increased by 0.5 points with its total mean score remaining quasi constant. Virtually unanimous standard deviation values were obtained for each item

Table 5 Characteristics associated with the items of the questionnaire prior to the HASIC peer group training

Items		$\bar{x} \pm SD$	P_{50}
Physical health	A01 Pre. How do you evaluate your physical health in nutrition habits?	2.25 $\pm$ 0.53	2.00
	A02 Pre. How do you evaluate your physical health in physical activity?	1.88 $\pm$ 0.68	2.00
	A03 Pre. How do you evaluate your physical health in drinking habits?	1.25 $\pm$ 0.44	1.00
	Total score of A dimension	1.92 $\pm$ 0.58	2.00
Mental Health	B01 Pre. How do you evaluate your mental health relating to attitude towards life?	2.29 $\pm$ 0.55	2.00
	B02 Pre. How do you evaluate your mental health relating to the possibility of making decisions about your life?	2.25 $\pm$ 0.44	2.00
	B03 Pre. How do you evaluate your mental health relating to self-esteem?	2.04 $\pm$ 0.69	2.00
	Total score of B dimension	2.25 $\pm$ 0.44	2.00
Social health	C01 Pre. I feel lonely	3.08 $\pm$ 0.97	3.00
	C02 Pre. I feel sad	3.00 $\pm$ 0.93	3.00
	C03 Pre. I feel that I have good relationships e.g. friends, relatives	3.63 $\pm$ 0.65	4.00
	Total score of C dimension	3.08 $\pm$ 0.93	3.00

Table 6 Associated characteristics to the items of the questionnaire after the HASIC peer group training

Items		$\bar{x} \pm SD$	P_{50}
Physical health	A01 Post. How do you evaluate your physical health in nutrition habits?	3.42 $\pm$ 0.50	3.00
	A02 Post. How do you evaluate your physical health in physical activity?	3.17 $\pm$ 0.38	3.00
	A03 Post. How do you evaluate your physical health in drinking habits?	2.29 $\pm$ 1.08	2.50
	Total score of A dimension	3.13 $\pm$ 0.34	3.00
Mental health	B01 Post. How do you evaluate your mental health relating to attitude towards life?	3.42 $\pm$ 0.72	3.50
	B02 Post. How do you evaluate your mental health relating to the possibility of making decisions about your life?	3.13 $\pm$ 0.68	3.00
	B03 Post. How do you evaluate your mental health relating to self-esteem?	3.50 $\pm$ 0.51	3.50
	Total score of B dimension	3.33 $\pm$ 0.70	3.00
Social health	C01 Post. I feel lonely	3.17 $\pm$ 0.87	3.00
	C02 Post. I feel sad	3.04 $\pm$ 0.86	3.00
	C03 Post. I feel that I have good relationships e.g. friends, relatives	3.89 $\pm$ 0.28	4.00
	Total score of C dimension	3.33 $\pm$ 0.76	3.50

before and after training. Figure 4 shows the effect of the HASIC programme intervention on the total scores of each dimension for the peer group.

After analysing the data collected in the sample, the exploratory analysis revealed that the training interventions performed in both groups (mentor and peer groups) were effective in this study. Next, an inferential analysis was performed to confirm whether the differences detected among the scores were significant, or not, in this study case.

Results of the inferential analysis

A nonparametric test was used for comparing the median scores of each item before and after the intervention for two related samples. This type of test is the most recommended in the literature for data of ordinal nature (28). In addition, the Shapiro–Wilk test was performed confirming the non-normality of the observation distribution as expected (see Tables 1 and 2). The Wilcoxon signed rank was the selected test for this purpose.

Regarding the mentor group, significant differences were found between the median scores before and after the training (Table 7) ($p < 0.05$ for all items individually, as well as for the total scores of each dimension). This test was also applied to peer group data (Table 8). Significant differences were found among the medians of the pre- and postintervention scores for all items in this study, except in C01 and C02 items belonging to the social wellness dimension. Consequently, this dimension was the only one in which differences between the total median scores were insignificant. Therefore, there is insufficient evidence to demonstrate that the intervention modifies the feeling of loneliness and depression among older people.

Discussion

Our findings confirm the feasibility and preliminary effectiveness of the HASIC training programme, based on peer group training and the use of ITCs, for acquiring the

Figure 4 Distribution of total scores of each dimension before-and-after training for peer group.

knowledge and skills necessary for adopting a healthy lifestyle in community-dwelling adults over 65 years of age. It is noteworthy that it is a pilot study, so that a convenience sampling was used for this purpose with a low number of participants. Consequently, the nonparametric statistical techniques were used to support the adequacy of this training program due to non-normality of the observations.

In general, the opportunities provided by this programme may prove beneficial for other groups of older people aged over 65, as they facilitate a better integration into society, enhance their social qualities, help prevent loneliness and isolation and decrease their sense of rejection – an imperative requirement according to previous research (7,29).

In accordance with previous studies on active ageing that have demonstrated that an intervention focused on the individual's social wellness and physical health is beneficial (25,30), our results show that, with the HASIC programme, not only have both domains improved, but they have also targeted and improved the participants' mental health. Another difference, when compared to previous studies, is that a prior educational intervention

Table 7 Results of the Wilcoxon signed-rank test in the group of mentors

Items		<i>P</i> ₅₀ Pre	<i>P</i> ₅₀ Post	Ranges (–Z)	<i>p</i> value
Physical health	A01. How do you evaluate your knowledge about physical health in nutrition?	2.00	3.00	–5.95	0.00
	A02. How do you evaluate your knowledge about physical health in physical activity?	2.00	3.00	–5.94	0.00
	A03. How do you evaluate your knowledge about physical health in drinking habits?	2.00	3.00	–5.87	0.00
	Total score of A dimension	2.00	3.00	–6.16	0.00
Mental health	B01. How do you evaluate your knowledge about mental health relating to attitude towards life?	2.00	3.00	–5.93	0.00
	B02. How do you evaluate your knowledge about mental health relating to the possibility of making decisions about your life?	2.00	3.00	–5.62	0.00
	B03. How do you evaluate your knowledge about mental health relating to self-esteem?	2.00	3.00	–5.86	0.00
	Total score of B dimension	2.00	3.00	–5.88	0.00
Social health	C01. How do you evaluate your knowledge about social health relating to loneliness?	2.00	3.00	–5.86	0.00
	C02. How do you evaluate your knowledge about social health relating to depression?	2.00	3.00	–5.43	0.00
	C03. How do you evaluate your knowledge about social health relating to social network?	2.00	4.00	–6.00	0.00
	Total score of C dimension	2.00	3.00	–5.94	0.00
Leadership skills	D01. How do you evaluate your group leading/mentoring skills relating to motivating group participants?	2.00	3.00	–5.56	0.00
	D02. How do you evaluate your group leading/mentoring skills relating to promoting interaction with participants?	2.00	3.00	–5.64	0.00
	D03. How do you evaluate your group leading/mentoring skills relating to leading the dialogue with the group participants?	2.00	3.00	–5.34	0.00
	Total score of D dimension	2.00	3.00	–5.58	0.00
Leadership attitude	E01. How do you evaluate your group leading/mentoring attitude relating to open mindedness?	3.00	3.00	–5.21	0.00
	E02. How do you evaluate your group leading/mentoring attitude relating to supportive attitude?	3.00	3.00	–5.23	0.00
	E03. How do you evaluate your group leading/mentoring attitude relating to creativeness?	3.00	3.00	–4.88	0.00
	Total score of E dimension	3.00	3.00	–5.25	0.00

Table 8 Results of the Wilcoxon signed-rank test in the peer group

Items		P_{50} Pre	P_{50} Post	Ranges (-Z)	p value
Physical health	A01. How do you evaluate your physical health in nutrition habits?	2.00	3.00	-4.18	0.00
	A02. How do you evaluate your physical health in physical activity?	2.00	3.00	-4.12	0.00
	A03. How do you evaluate your physical health in drinking habits?	1.00	2.50	-3.32	0.00
	Total score of A dimension	2.00	3.00	-4.28	0.00
Mental health	B01. How do you evaluate your mental health relating to attitude towards life?	2.00	3.50	-3.91	0.00
	B02. How do you evaluate your mental health relating to the possibility of making decisions about your life?	2.00	3.00	-3.87	0.00
	B03. How do you evaluate your mental health relating to self-esteem?	2.00	3.50	-4.21	0.00
	Total score of B dimension	2.00	3.00	-4.02	0.00
Social wellness	C01. I feel lonely	3.00	3.00	-0.58	0.56
	C02. I feel sad	3.00	3.00	-0.19	0.85
	C03. I feel that I have good relationships, e.g. friends, relatives	4.00	4.00	-2.11	0.03
	Total score of C dimension	3.00	3.50	-1.73	0.08

was provided in the HASIC programme in order to train those working with older people (i.e. mentors and professionals). This training, we believe, both increases the specificity and effectiveness of the intervention (31).

Continuing the research line of current studies, this programme incorporated the use of ICTs for educating older people (21,22). Although some studies have underlined the benefits of using these tools as an aid for any intervention (8,20), there is a lack of programmes for older people, to date, that use technology. Our results show that the training of older people via ITCs and, specifically, online Internet support, is effective. This clearly indicates the need to continue researching and developing online programmes specifically designed for this age group.

Concerning the questionnaires used in the HASIC programme, these have demonstrated preliminary effectiveness for this purpose. As previous studies have shown, we believe that the use of these Likert-type rating scales is the most effective in this type of intervention (20,21). Furthermore, the participants were enthusiastic regarding the inclusion of open questions, as this allowed them to share their opinion and make suggestions regarding future research projects.

This programme aims at increasing the knowledge and empowerment of older people via active ageing. The main innovation of this study was the evaluation of the HASIC programme, based on a pioneer combination of ICTs and the Internet, the support offered by peer groups and the active participation of older people in the community; all revealing factors that have not been used in prior research studies.

Limitations

This pilot study has several limitations, requiring further study, for example the small sample size, the inclusion of

only one country/culture or the fact that the number of students participating in mentor training interventions was higher than the number of older people volunteers. Notwithstanding, the methodology met the main objectives. Thus, further research is required to evaluate the entire HASIC programme, with a larger sample integrated by each participant country and by collecting more extensive sociodemographic data from participants in order to examine whether there are differences in the training provided depending on other factors.

Moreover, the use of a self-report questionnaire as a measure of knowledge acquisition provided by training programmes could be another limitation, due to possible response bias.

Conclusions

This study has confirmed the preliminary effectiveness as well as the feasibility of the HASIC project as being a positive resource for promoting active ageing in older people. This is an innovative programme which combines community work with ICTs. Moreover, it is noteworthy that this programme promotes healthy lifestyles which may benefit older people from a range of health perspectives or domains (physical, mental and social health).

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Conflict of interest

The researchers declare no conflict of interests.

Ethical approval

This study was conducted according to the ethical guidelines and legal requirements of the study country and the ethical standards of the University.

Furthermore, this study was approved by the University of Castilla-La Mancha (01_2015) and the managers of the centres where the study was undertaken. Moreover, all participants provided their written informed consent.

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