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Long-term Results of the Expert Patients Program in Patients with Cardiovascular Disease: A Cohort Study

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Abstract

Background: The Expert Patients Program (EPP) has high non-participation and dropout rates and some uncertainty on its effectiveness.

Aim: To identify, in patients with a cardiovascular event (CVE), the usefulness of participating in the EPP in relation to the quality of life, morbi-mortality and use of specialized healthcare resources during two years.

Methods: The research design is A quasi-experimental study with non-random assignment of EPP with two years of monitoring and the subjects are patients at the first acute myocardial infarction (AMI) or ischemic stroke. The measures taken are Clinical and socio-demographic variables and a quality of life questionnaire were registered at starting. During the monitoring, the new CVE, the number of specialized out-patient or emergency consultations and hospital admittances, life questionnaire and death, were reported. Descriptive and comparative bivariate and multivariate analysis was conducted as statistical analysis.

Results: 100 patients with AMI and 69 with stroke were included, 51% refused and 10% dropped out. During monitoring, 21% presented a CVE, 59% went to the emergency, 34% required admittance, and 4% died without any relationship with the participation. There was a significantly higher frequency of scheduled visits in patients who received the intervention. The general health, vitality and mental health worsened significantly regardless of the participation. The physical functioning, social functioning and bodily pain did not undergo significant differences; while the physical and emotional roles changed significantly and in a different way according to the degree of participation.

Conclusions: Despite the low participation in the PPE, we find a significant improvement in the quality of life in the intervention group.

Keywords: Expert patients program; Self-care; Quality of life; Cardiovascular disease; Clinical study

Abbreviations EPP: Expert Patients Program; AMI: Acute Myocardial Infarction; CVE: Cardiovascular Event; CVD: Cardiovascular Diseases; CVRF: Cardiovascular Risk Factors

Research Highlights

- Low participation in the expert patient program after a cardiovascular event
- Improved quality of life in the program participants
- Better adherence to scheduled specialist consultations in the program participants

Introduction

Ischemic heart disease and cerebrovascular disease are the two cardiovascular diseases (CVD) with the highest consumption of resources [1,2] and poor control of the cardiovascular risk factors (CVRF) in the long term [3,4], despite the recommendations [5]. In order to improve these results, the role that the patient himself has in the control and prognosis of his disease is attempted to be increased [6].

The American Institute for Healthcare Improvement and Stanford University [7] proposed the Expert Patient Program (EPP) [8] (an educational intervention directed by non-professional persons) as an approach for the chronic patient with good results in self-monitoring and decrease in the use of healthcare resources [9]; the reason for which it has been extended into different countries [10,11]. Nonetheless, there is some uncertainty on its actual effectiveness [12,13].

This paper evaluates, in patients that have suffered a cardiovascular event, the usefulness of participating in the EPP in relation to the quality of life, morbi-mortality and the use of specialized healthcare resources during two years.

Materials and Methods

A quasi-experimental study with non-random assignment of the intervention (EPP) and two years of monitoring. Adult patients tended in public hospitals in the province of Albacete (Spain) for a first cardiovascular event (CVE) of the acute myocardial infarction type (AMI) or lacunar ischemic stroke, were recruited in different moments of evolution. Those with a life expectancy of less than two years, and dependent patients or those with physical or mental sequelae that impeded them from carrying out the intervention were excluded.

The recruitment was carried out by trained hospital professionals that tended these patients (nurses, neurologists or cardiologists), or by administrative staff. EPP was offered as voluntary with duration of six weeks, two hours one day a week. Travel was facilitated.

Five courses (15-20 participants/course) were carried out: two in the capital and one in each town with a district hospital. All of the patients, including those that refused, were asked for their consent to be able to record the initial variables: gender, age, CVRF (obesity, diabetes mellitus, arterial hypertension, dyslipidemia, smoking and cardiovascular risk score), cardiovascular event and time transpired, employment situation (unemployed, retired, housewife, employed), academic level (no studies, primary, secondary, university), caretaker support (stable couple, family, no family, no caretaker), the reasons for not participating or abandonment, as well as the authorization to send them a quality of life questionnaire (SF36_2dEd) at starting, and after one and two years. The SF36_2dEd items identify eight dimensions: physical and social functioning, role limitations due to physical or emotional problems, bodily pain, general health perceptions, vitality and mental health, scored between 0 (worst) and 100 (best) [14,15]. Another item evaluates the perception of health with respect to the previous year.

The intervention was done by the Spanish Health and Society Foundation [8], according to Stanford University [7] Three types of patients were differentiated: non-participants (those who refused to participate from the first moment), participants (those who went to three or more sessions) and those that abandoned it (those that initially decided to participate, but never did or attended <3 sessions).

During the monitoring, the new CVE (CIE_9thEd: angina, AMI, cardiac failure, stroke, severe peripheral or aortic event), the number of contacts with specialized out-patient consultations, emergency service (hospital or emergency hotline) or hospital admittances (cardiovascular or not), death and its etiology, were reported.

The analysis was descriptive and comparative (by intention to treat and by intervention), bivariate (paired or non-paired) and multivariate. According to the dependent variable we conducted: logistic regression (CVE and death), linear regression (frequency of services and final health dimensions), and multifactorial ANOVA for repeated measurements (change in health dimensions). The models were adjusted using the predicted probability of participating or receiving the intervention ("propensity score"), once its predictive value was verified over 70% [16,17]. The statistical significance was established for levels of "p" less than 0.05. The strength of the association was measured by mean differences or Odds Ratio, and the population estimate through the confidence interval of 95%.

Results

The study included 169 patients, 69 with stroke and 100 with AMI. The mean age was 64 years (68% over 59 years) and 73% were men. Eighty-six patients refused to participate (51% non-participants) and of those that agreed, 20% abandoned (dropouts: 10% of the total). The most frequent cause of non-participation or abandonment was the lack of time and occupation with other tasks.

The patients without family or caretaker support, that do not smoke, that have primary or secondary studies and worse emotional role, were the ones that more easily agreed to participate in the course (Table 1).

	N	Participant(%)	Non-participant(%)	p_b	OR	IC95% OR	p_m
Sex (female)	46	50	50	-	-	-	-
Age (average: SD) years	169	63:10	64:11	-	-	-	-
Stroke	69	56.5	43.5	-	-	-	-
High blood pressure	123	47	53	-	-	-	-
Diabetes	61	41	59	-	-	-	-
Dyslipidemia	112	51	49	-	-	-	-
Obesity							
No	26	50	50	-	-	-	-
Overweight	53	58.5	41.5	-	-	-	-
Obesity	42	59.5	40.5	-	-	-	-
Smoking habit							
No	87	56	44	*0.04	1	1	0.008

Former smoker	23	48	52		1.66	1.6-16.8	0.01
Current smoker	59	39	61		5.2	1.5-35.5	0.007
Level of education							
No education	69	43.5	56.5	0.03	-	-	-
Primary education	53	68	32		-	-	-
Secondary education	16	69	31		-	-	-
Higher education	11	45.5	54.5		-	-	-
Family support							
Stable partner	115	51	49	*0.04	-	-	-
Close caregiver	13	54	46		-	-	-
Lives on their own, distant caregiver	18	78	22		-	-	-
Employment status							
Unemployed	1	0	100	-	-	-	-
Employed	54	44	56	-	-	-	-
Housewife or retired	102	55	45	-	-	-	-
Time from the event (median: P_{25}-P_{75}) months	169	17:5-52	39:14-77	0.003	-	-	-
<6 months	29	74.2	27.6	0.003	1	1	0.02
6-12 months	18	61.1	38.9	-	1.1	0.1-16.6	NS
12-24 months	36	41.7	58.3	-	5.2	0.8-35	0.09
>24 months	86	41.9	58.1		10.6	1.8-60.2	0.008
CV risk score grade (average: SD)	169	15.2:5.9	16.2:5.6	-	-	-	-
Risk ratio (average: SD)	169	8.5:4.9	8.9:5.1	-	-	-	-
Quality of life (SF36_2ndEd) Median (P_{25}-P_{75})							
Physical function	116	65 (40-85)	70 (40-90)	-	-	-	-
Physical condition	118	56 (25-94)	81 (43-97)	0.15	-	-	0.02
Bodily pain	116	62 (41-100)	72 (42-84)	-	-	-	-
General health	115	56 (40-72)	50 (36-72)	-	-	-	-
Vitality	114	56 (37.55-75)	56 (31-81)	-	-	-	-
Social function	117	75 (50-100)	87.5 (59-100)	-	-	-	-
Emotional condition	117	75 (50-100)	91 (67-100)	0.02	-	-	-
Mental health	113	70 (55-90)	75 (47.5-87.5)	-	-	-	-
Health transition	117	3 (2-4)	3 (3-4)	-	-	-	-
p_b: "p" value bivariate analysis; p_m: "p" value multivariate analysis; *"p" value of lineal association; NS: not significant							

Table 1: Comparison of the patient baseline features, by intention to treat (bivariate and multivariate analysis).

However, if we take into account those that abandon (Table 2), those that remain have a worse physical and emotional role and a profile of less cardiovascular risk (younger, non-diabetics and lower score). As for the time transpired from the event, the limit of a year could

differentiate better the degree of participation, as is also shown with the multivariate analysis, being the independent factors for not participating: smoking, the time longer than one year and the worst physical role (Table 1); adding that of being female in the analysis by intervention (Table 2).

	N	Participant (%)	Non-participant (%)	p_b	OR	IC95% OR	p_m
Sex (female)	46	33	67	-	4.4	1.0-18.4	0.04
Age (average: SD) years	169	62(10)	65:11	-	-	-	-
-Stroke	69	35	65	0.06	-	-	-
High blood pressure	123	37	63	0.01	-	-	-
Diabetes	61	26	74	-	-	-	-
Dyslipidemia	112	42	58	-	-	-	-
Obesity							
No	26	38.5	61.5	-	-	-	-
Overweight	53	43	57	-	-	-	-
Obesity	42	52	48	-	-	-	-
Smoking habit							
No	87	44	56		1	1	0.03
Former smoker	23	35	65	*0.04	3.96	1.2-12.6	0.02
Current smoker	59	34	66		6.2	1.3-30.8	0.02
Level of education:							
No education	69	33	67		-	-	-
Primary education	53	53	47		-	-	-
Secondary education	16	62.5	37.5	0.06	-	-	-
Higher education	11	36	64		-	-	-
Family support							
Stable partner	115	41	59	-	-	-	-
Close caregiver	13	38.5	61.5	-	-	-	-
Lives on their own, distant caregiver	18	67	33	-	-	-	-
Employment status							
Unemployed	1	0	100		-	-	-
Employed	54	41	59	*0.05	-	-	-
Housewife or retired	102	41	59		-	-	-
Time from the event (median: P_{25}-P_{75}) months	169	18 (4.75-52.25)	32.5 (12.75-64)	0.04	-	-	0.07
<6 months	29	58.6	41.4	0.01	1	1	
6-12 months	18	50.0	50.0	-	2.2	0.5-15.3	NS
12-24 months	36	30.6	69.4	-	3.3	0.7-16.4	NS
>24 months	86	33.7	66.3	-	6.3	1.5-25.7	0.01
CV risk score grade (average: SD)	169	14.6 (5.6)	16.4 (5.8)	0.06	-	-	-

Risk ratio (average: SD)	169	8.4 (4.6)	9.0 (5.2)	0.06	-	-	-
Quality of life (SF36_2ndEd) Median (P_{25}-P_{75})							
Physical function	116	65 (40-85)	70 (45-85)	-	-	-	-
Physical condition	118	50 (25-87.5)	75 (44-94)	0.05	-	-	0.008
Bodily pain	51	-	-	-	1	1	-
General health	21	-	-	-	4.7	1.1-20.1	-
Vitality	46	-	-	-	5.6	1.8-16.9	-
Social function	116	62 (34-96)	72 (44-84)	-	-	-	-
Emotional condition	115	55 (40-72)	56 (41-72)	-	-	-	-
Mental health	114	50 (31-69)	59 (39-81)	-	-	-	-
Health transition	117	75 (50-100)	87.5 (62.5-100)	-	-	-	-
Sex (female)	117	75 (50-96)	92 (60-100)	0.01	-	-	-
Age (average: SD) years	113	65 (54-85)	80 (55-90)	-	-	-	-
Stroke	117	65 (40-85)	70 (45-85)	-	-	-	-

Table 2: Comparison of the patient baseline features, by intervention (bivariate and multivariate analysis).

During monitoring, 35 patients presented a CVE (21%), with cardiac failure being the most frequent event (26%), followed by ischemic stroke (23%) and AMI (20%). Six patients died (4%): one from stroke, two from sudden death, two from a non-CVD and one unknown. No significant relationship was found between the morbi-mortality and the initial variables or the degree of participation.

The 59% went at least once to the emergency room: 23% went once, 13% twice and 8% three times. Fourteen percent of the patients of the AMI group and 42% of the stroke group did not go to any cardiology and neurology consultation, respectively, without any relationship with the initial variables or participation. The median of frequency of specialized consultations and/or emergency service was 4 (P_{25-75}: 2-7.5). Admittance was required by 33% (27% once and 3% twice), being 30% of them for CVD. By evaluating the use of healthcare services according to the different CVRF, a trend was found for the diabetic, hypertensive, non-obese and non-smoking patients to go more frequently to out-patient consultations or emergency rooms if they had attended the EPP. Furthermore, in the multivariate analysis, there was a significantly higher frequency of joint cardiology and neurology scheduled consultations with those patients that received the intervention (OR: 4.2, IC95%: 1.2-6.1; p=0.01) without finding these results in relation to another type of health-services. This result did not appear in the analysis by intention to treat, nor was a relationship found with the admittances (total or for CVD).

The degree of completion of the SF36_2dEd questionnaires was quite variable and decreased during monitoring, despite making telephone reminders, resending of the questionnaires, etc. Thirty patients never collaborated (18%), 64% filled out three questionnaires, 13% two and 5% one questionnaire, with significant differences with the degree of participation/attendance at the EPP (Table 3).

		Baseline (%)			**First year (%)**			**Second year (%)**		
		Valid	**Invalid**	**Not met**	**Valid**	**Invalid**	**Not met**	**Valid**	**Invalid**	**Not met**
Participant		78.5	13.9	7.6	82.3	11.4	63	91.2	2.5	6.3
Non-participant		48.6	2.4	49	62.8	1.2	36	59.6	7.1	33.3
p			<0.0001		<0.0001			<0.0001		
Intervention		79.4	12.7	7.9	84.1	11.1	4.8	93.7	1.6	4.8
Non-intervention		52	5	43	66	3	31	63	7	30
p		<0.0001			<0.0001			<0.0001		
		Valid	Invalid	Not met	Valid	Invalid	Not met	Valid	Invalid	Not met
Age	<55	24.5	15.4	29.2	30.3	0	14.7	28.7	12.5	15.2

years	56-65	31.4	38.5	18.8	31.1	30	17.7	32	25	15.2
	66-73	25.5	23.1	22.9	28.9	30	32.4	23	12.5	33.3
	>73	18.6	23.1	29.2	16.7	40	35.3	16.3	50	36.3
	p	0.55	0.02			0.02				
Body Mass Index	<25	20.6	0	10.4	19.3	30.0	0	20.5	12.5	0
	25-29	24.5	54.0	12.5	30.3	20.0	0	29.5	25	0
	>29	54.9	46.0	77.1	50.4	50.0	100	50.0	62.5	100
	p	0.004	<0.0001			<0.0001				

Table 3: Description of the completion of quality of life questionnaires by intention to treat, intervention, age and body mass index for different times of the study (excluding the deaths).

The relationship between collaboration and the initial characteristics of the patients was studied, classifying the questionnaires as: valid, not valid and not completed. No significant differences were found in relation to the level of studies, employment situation, type of CVE or CVRF except age and obesity. We found worse completion in older and obese persons (body mass index obtained at starting in 163 patients), who collaborated significantly less throughout the study (Table 3).

As a consequence of these non-random differences in the lost data, and given that we did not know the missing information, different allocation methods of the lost cases were used, without finding significant differences between the degree of participation and the scores in the health dimensions in different years (the values of the six patients who died was "0"). Nonetheless, in 118 patients we did have sufficient information to analyze the degree of change between the two years of monitoring and the baseline. As a result, we found that in the group of participants, general health decreased throughout the time period, but the emotional role increased significantly. Meanwhile, in the non-participating group, there was a significant decrease in physical functioning, general health, vitality and emotional role. Results that, moreover, are superimposable, and even more striking, when we conducted the analysis by intervention in which the non-intervention group were worse in all the health dimensions except bodily pain where it remained similar; while in the intervention group a significant decrease in general health and an improvement in the emotional role were observed (Table 4).

Quality of life (SF36_2nd Ed) Median (P_{25}-P_{75})	**Participant**			**Non-participant**			**Intervention**			**Non-intervention**		
	Baseline	**Second year**	**p**	**Baseline**	**Second year**	**p**	**Baseline**	**Second year**	**p**	**Baseline**	**Second year**	**p**
Physical function	65 (40-85)	65 (45-85)		70 (40-90)	60 (30-90)	0.04	65 (40-85)	65 (45-85)		70 (45-85)	60 (38-85)	0.02
Physical condition	56 (25-94)	59 (33-88)		81 (43-97)	56 (23-100)	0.07	50 (25-88)	56 (31-88)		75 (44-94)	63 (25-100)	0.06
Bodily pain	62 (41-100)	62 (41-92)		72 (42-84)	62 (31-100)		62 (34-96)	62 (41-100)		72 (44-84)	62 (31-100)	
General health	56 (40-72)	45 (30-67)	0.001	50 (36-72)	42 (27-62)	0.03	55 (40-72)	47 (35-67)	0.02	56 (41-72)	42 (27-61)	0.02
Vitality	56 (38-75)	50 (31-69)	0.08	56 (31-81)	50 (28-69)	0.04	50 (31-69)	50 (38-69)		59 (39-81)	50 (31-69)	0.001
Social function	75 (50-100)	81 (63-100)		88 (59-100)	88 (50-100)		75 (50-100)	75 (63-100)		88 (63-100)	88 (50-100)	0.07
Emotional condition	75 (50-100)	92 (67-100)	0.02	91 (67-100)	75 (50-100)	0.03	75 (50-96)	92 (67-100)	0.009	92 (60-100)	75 (50-100)	0.04
Mental health	70 (55-90)	70 (50-85)		75 (48-88)	70 (48-85)		65 (54-85)	70 (50-85)		80 (55-90)	70 (50-85)	0.02

Table 4: Change in the quality of life dimensions during two-year follow-up according to participation degree.

Upon evaluating the "health transition" we found similar results: no differences upon comparing the final result with the degree of participation; but there was a difference when we compared the change in score at two years and the baseline in a paired manner, noting significantly improved scores in the patients that received the intervention. Following the multivariate ANOVA analysis for repeated measurements we found that general health, vitality and mental health worsened significantly throughout the time period regardless of the degree of participation. The physical or social functioning and bodily pain did not undergo significant differences in their score over time; while the physical and emotional role changed significantly and in a different way over time according to the degree of participation. The

participant patients presented progressively higher scores; while the non-participants and those that abandoned presented lower scores, with the most marked of these differences being in the analysis by intervention (Table 5).

Quality of life (SF36_2nd Ed) Mean ± Standard deviation	Intention to treat analysis							Intervention analysis						
	Participant			Non-participant			p	Intervention			Non-intervention			p
	Baseline	1st year	2nd year	Baseline	1st year	2nd year		Baseline	1st year	2nd year	Baseline	1st year	2nd year	
Physical function	60 ± 29	60 ± 29	60 ± 28	61 ± 32	58 ± 32	55 ± 33		60 ± 29	60 ± 28	60 ± 29	60 ± 31	58 ± 32	56 ± 32	
Physical condition	55 ± 35	56 ± 32	56 ± 34	63 ± 36	54 ± 36	54 ± 39	0.05	52 ± 36	57 ± 33	57 ± 34	63 ± 35	54 ± 34	54 ± 38	0.01
Bodily pain	59 ± 32	56 ± 32	59 ± 32	60 ± 31	59 ± 32	56 ± 36		58 ± 31	57 ± 32	59 ± 33	61 ± 32	57 ± 32	57 ± 34	
General health	54 ± 23	49 ± 22	46 ± 24	47 ± ± 25	41 ± 21	42 ± 25		53 ± 22	48 ± 21	47 ± 24	50 ± 25	43 ± 22	42 ± 25	
Vitality	52 ± 26	49 ± 25	48 ± 24	51 ± 29	47 ± 26	46 ± 29		49 ± 26	49 ± 25	48 ± 24	54 ± 29	48 ± 26	46 ± 28	
Social function	70 ± 30	71 ± 30	71 ± 31	72 ± 32	71 ± 29	69 ± 35		68 ± 30	71 ± 29	71 ± 31	73 ± 31	70 ± 29	70 ± 34	
Emotional condition	65 ± 32	71 ± 32	75 ± 33	75 ± 33	71 ± 31	68 ± 34	0.02	63 ± 32	71 ± 33	74 ± 33	75 ± 31	72 ± 31	70 ± 33	0.01
Mental health	67 ± 27	63 ± 25	62 ± 26	64 ± 28	64 ± 26	63 ± 28		65 ± 27	63 ± 24	63 ± 27	67 ± 28	64 ± 26	62 ± 27	

Table 5: Multivariate analysis of change in the quality of life dimensions during two-year follow-up according to participation degree (ANOVA for repeated measurements).

Discussion

The healthcare models are changing [18]. The educational self-care programs for patients with chronic diseases may bring about this change, since several authors already described it [13,19,20], by helping them to take an active function in the treatment and evolution of their disease, in addition to recognizing it as a cost-effective strategy [21-23]. The EPP was developed as a program on self-care of chronic diseases [7], which is based on theoretical behavioral models [24], directed by non-professional leaders, adopting with the participants a horizontal relationship. These programs began for groups of patients with rheumatoid arthritis, where good results were achieved [25], subsequently implemented in different contexts. However, there are authors [26] that warn of the exaggerated effectiveness and the possibility that their benefits are only maintained in the short term. One of the conclusions of the Cochrane review [3] is the short follow-up period in the majority of the studies (six months) and the limited evaluation of the effect on healthcare use. Other considerations in this review are: the low participation and the frequent finding of a good state of health in the inclusion of the patients.

We offered the EPP to patients with CVD, carrying out a two-year follow-up. The intervention was not randomized. For this reason, in the multivariate analysis, the adjustment through predicted probability was used, as one of the best statistical strategies for being able to measure the effect of a non-randomized intervention [16,17]. In addition, all the analyses were conducted by intention to treat and by intervention.

The degree of participation was low, but similar to that described [3]. We verified that, among the patients there were significant differences at the initial moment: the patients that rejected the participation and those that abandoned were those that were less concerned about their disease: by smoking despite the event, by having fewer sequelae (better physical role) and for having transpired more time since the initial event without the diseases appearing again (we included patients with their first event). Nonetheless, it could also be interpreted as indirect characteristics of patients in which it is more difficult to control the CVRF, not only because they may not feel at risk (time has transpired without new events), and in addition they continue to smoke actively, but rather because the detailed variables in the bivariate analysis are also similar to those described by our group in long-term follow-up of patients with AMI [4]. This interpretation would also help to explain the higher frequency of cardiology and neurology visits in the intervention group, by being scheduled appointments. If this were so, it would mean that the patients that remained "outside" this type of program could be those of greatest risk. An aspect that is aggravated even more by finding that women more frequently abandoned the course once recruited. We relate this result, more than to the female gender, to the fact that this characteristic could be an indirect datum of the higher degree of responsibility in the care of others compared to her own, or the priority that women give to the latter. The results of the quantitative analysis on the non-participating patient profile are complemented by those obtained by means of the qualitative analysis of the discourses that are the motive for another publication (accepted for publication).

The characteristics of the patients at starting are superimposed on those described in other series of patients with CVE and presented a quality of life similar to that described for persons over 60 years of age in Spain [27], although with a worse physical and emotional role in our sample, with greater differences appearing in the intervention group.

During the monitoring, 21% presented at least one other CVE, 4% died and the quality of life worsened significantly in the entire set of patients over the time period regardless of the degree of participation. The physical and social functioning, as well as bodily pain, was not changed during the time, without the degree of participation having an impact; while the physical and emotional role changed independently and significantly over the time period in relation to those that did not receive it. These specific dimensions provide us with information on the degree of disability that the patient recognizes for the realization of his daily and/or work activities in relation to physical or to emotional problems. We consider that having improved these scores in participants in relation to those that did not receive it was attributed to the fact that this type of programs can actually help to confront the disease from another perspective and that this can influence how they perceive or bear the consequences or sequelae of their disease. That is to say, their self-efficacy would improve, by the fact of being able to solve small day-to-day problems, even though their health is deteriorating throughout the time. These results can be concordant with those that come from the meta-analysis [3], which shows that the intervention has a small and statistically significant effect on depression and anxiety and small improvements in the psychological wellbeing that are not statistically or clinically significant.

We do not find significant differences in relation to morbi-mortality or the number of hospital admittances, emergency care or consultations. However, we can verify that the intervention group patients went with greater frequency to the cardiology and neurology consultations as a whole during the follow-up, which we could not attribute to differences in other variables such as the time transpired since the event, baseline comorbidity or increase in the appearance of CVE. This result has not been described previously in other studies. Our interpretation is positive, since the consultations with the specialists depends on the appointments that the professional recommends, unless they become clinically worse, which would be evidenced by greater frequency in the emergency services or by an increase of new CVE in this group, which we have not verified. On the contrary, another possible explanation could be that those patients that did not receive the intervention did not go to their appointments scheduled by the specialists as another sign of the lack of priority in taking responsibility for their health.

In conclusion, at two years of follow-up of patients with a first CVE we find an improvement in the quality of life and in taking responsibility for their disease in the patients that received the EPP without significant differences in the morbi-mortality.

Biostatistics

The statistical methods of this study were reviewed by Lorena Vega. Degree in Statistics, Research Unit, Health Research Institute, Biomedical Research Foundation, University Hospital of La Princesa.

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Institutional Review Board Stamen

The study was reviewed and approved by University General Hospital of Albacete Institutional Review Board.

Informed Consent Statement

All study participants, or their legal guardians, provided informed consent prior to study.

Data Sharing Statement

Consent for sharing data was not obtained but the presented data were anonymized and the risk of identification is low.

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