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Research report

Effectiveness of a multi-component programme for managing depression in primary care: A cluster randomized trial. The INDI project

Enric Aragonès [a,*], Josep Lluís Piñol [a], Antonia Caballero [a], Germán López-Cortacans [a], Pilar Casaus [b], Josep Maria Hernández [a], Waleska Badia [a], Sílvia Folch [a]

[a] Tarragona-Reus Primary Care Area, Catalan Health Institute and IDIAP (Primary Care Research Institute) Jordi Gol, Barcelona, Spain.
[b] University Psychiatric Hospital Institut Pere Mata, Rovira i Virgili University, Reus, Spain.

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ABSTRACT

Background: There are significant shortcomings in the management and clinical outcomes of depressed patients. The objective is to assess the effectiveness of a multi-component programme to improve the management of depression in primary care.

Methods: This is a cluster-randomized controlled trial, conducted between June 2007 and June 2010. Twenty primary care centres were allocated to intervention group or usual care group. The intervention consisted of a multi-component programme with clinical, educational and organizational procedures including primary care nurses working as case-managers. Outcomes were monitored by a blinded interviewer at 0, 3, 6 and 12 months. Trial registration: ISRCTN16384353, at http://isrctn.org.

Results: In total, 338 adult patients with major depression (DSM-IV) were assessed at baseline. At 12 months, 302 patients were assessed, 172 in the intervention group and 130 in the control group. The severity of depression (mean Patient Health Questionnaire-9 score) was 1.76 points lower in the intervention group [7.15 vs. 8.78, 95% CI = −3.53 to 0.02, $p=0.053$]. The treatment response rate was 15.4% higher in the intervention group than in the controls [66.9% vs. 51.5%, odds ratio 1.9, 95% CI = 1.2 to 3.1, $p=0.011$)], and the remission rate was 13.4% higher [48.8% vs. 35.4%, odds ratio 1.8, 95% CI = 1.1 to 2.9, $p=0.026$)].

Limitations: Unblinded physicians diagnosed depression in their patients and decided whether to include them in the study, so we cannot discount a hidden selection bias.

Conclusions: The programme for managing depression leads to better clinical outcomes in patients with major depression in primary care settings.

1. Introduction

The most common mental disorders in the general population—major depression included—are largely managed in primary care (Üstün and Sartorius, 1995). Even so, there are significant shortcomings in the diagnosis, treatment and follow-up of depressed patients (Fernández et al., 2006, 2010), and clinical outcomes are often unsatisfactory (Wittchen et al., 2001). In primary care, depressed patients are often not sufficiently monitored, so there is little chance of supervising clinical evolution and treatment compliance, applying measures to improve adherence, or adjusting treatments if evolution is unsuitable (Pinto-Meza et al., 2008).

Various strategies have been tested in an attempt to improve the clinical outcomes of depression in primary care and reliable scientific data demonstrates that complex models of disease management involving changes in organization and affecting the various components of the care process can lead to better clinical results (Gilbody et al., 2003, 2006). The aim of these models of collaborative care is to improve the clinical outcomes of depression by increasing diagnostic quality, encouraging proactive, evidence-based therapeutic management, and supporting the self-management capacity of the patients themselves. They introduce the figure of the case manager who acts as a link between patients, primary care and mental health specialists. Case managers provide support to primary care with the health education of the depressed patient, the encouragement of adherence to treatment, and the clinical monitoring of treatment response to adjust therapeutic plans in those patients who do not improve (Katon et al., 2001).

Because this evidence comes mainly from managed-care organizations in the United States, the question arises as to whether these strategies can be equally effective in different health systems (Gilbody et al., 2006; Gunn et al., 2006). Spain has a highly developed primary-care system with universal coverage, organised by catchment areas and providing care for over 97% of the population free of charge at the point of use. Public health

* Corresponding author. Tel.: +34 9777773015; fax: +34 977521873.
E-mail address: earagones.tarte.ics@gencat.cat (E. Aragonès).

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centres are staffed with family physicians, paediatricians and nurses, and other personnel. Primary care doctors have a patient list and are gatekeepers for specialist care. This system is linked to mental health care centres (Borkan et al., 2010).

2. Methods

2.1. Objective

The aim of this study was to compare the effectiveness of a multi-component programme for managing depression in primary care with the usual clinical management in the Spanish healthcare system.

2.2. Design overview

This is a controlled trial with random allocation of clusters (primary care centres) to two alternative arms: (a) intervention arm (a new depression-management programme) and (b) control arm (usual care). The allocation units were the primary care centres since the intervention was implemented at the level of the centres and the health professionals rather than individual patients, so all patients from one centre were probably treated in a very similar fashion. The outcomes are evaluated at patient level (Ukoumunne et al., 1999).

The study was conducted in accordance with the ethical principles that have their origin in the Declaration of Helsinki, consistent with the Guidelines for Good Practice in Primary Care Research (IDIAP Jordi Gol, 2010) and applicable regulatory requirements. All participants or their legal representatives provided written informed consent. The Research Ethics Committee of the Jordi Gol Primary Care Research Institute (IDIAP) approved the study protocol in Barcelona, on 29 March 2006 (ref: P06/16).

We enrolled patients between June 2007 and June 2009 and we completed the last follow-up on study patients in June 2010. The study protocol is registered at http://isrctn.org [ISRCTN16384353], and is described in detail elsewhere (Aragonès et al., 2007).

2.3. Setting and participants

The participating settings were 20 primary care centres belonging to the public health system in the province of Tarragona, Catalonia, Spain.

Inclusion criteria for patients were to be to be assigned to the doctor's list, aged ≥ 18 years, contactable by telephone and diagnosed with a major depressive episode (Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition; DSM-IV), with a score of >14 on the Patient Health Questionnaire (PHQ-9; moderate to severe depression), or 10 to 14 (mild depression) – in this case the episode had to have persisted for more than one month with no improvement – and they could not have received antidepressant medication in the previous three months. Exclusion criteria were physical, psychological or language limitations or a concurrent illness that impeded comprehension or participation in the study evaluations; psychotic or bipolar disorders; alcohol or drug dependence; or pregnancy or breastfeeding.

2.4. Patient selection and recruitment procedure

The recruitment method did not include systematic screening for depression. The participating family physicians selected patients to take part in the study from among those who attended their surgery and were clinically diagnosed as depressed. The family physicians had to verify that the depressive episode complied with the standardized diagnostic criteria (DSM-IV) for major depression and the PHQ-9 severity criteria, check all other inclusion and exclusion norms, and request the patient's consent to take part in the study. The procedure for selecting and including patients was identical in all the participating health centres, and the core research team played no part in selecting and recruiting the patients.

2.5. Randomization and masking

The participating primary care centres (clusters) had to agree to participate before they had been allocated to the intervention or control arm. The allocation procedure was based on a pair-matched cluster randomised design (Ukoumunne et al., 1999). The centres were matched by number of participating doctors, urban/rural location and availability of a psychiatrist in the centre itself. A blinded person not involved in the study allocated the centres of each pair to intervention arm or control arm, by means of a random sequence of numbers.

2.6. Intervention

The intervention consists of a multi-component programme based on the chronic care model (Bodenheimer et al., 2002) adapted to primary care in the Spanish public health system. Its components are of a training-based, organisational, clinical, and health-related educational nature and target how the management of depression is organized within the primary-care team and how health professional skills can be improved (Table 1). The intervention did not use more professionals nor procedures than were already available at the primary care centres. The programme has been described in detail elsewhere (Aragonès et al., 2007, 2008). The materials required for its implementation are available at www.projecteindi.cat.

2.6.1. Training of nurses and doctors

The training consisted of a one-day workshop once a year for three years for general practitioners and primary care nurses, and a 2-h session every quarter to consolidate and update the knowledge and skills acquired.

The participating general practitioners were trained to improve their knowledge and ability at diagnosing depression, evaluating suicidal risk, and treating and monitoring depression. The workshops emphasized the care procedure, active clinical monitoring and the options available when the proposed aims (short-term remission and no long-term relapse) are not achieved.

Nurses on the staff of the primary care centres with no prior specialization in mental health received training in the clinical aspects of depression, antidepressant treatment, adverse effects, treatment adherence and methods to ensure it, and warning signs in the evolution of depression.

Table 1
Key points of the depression management programme.

- Clinical training and support tools (guide, algorithms) for decisions taken by primary-care doctors and nurses
- Case-managers (primary care nursing) who can:
  - provide psychoeducation and support to patients' self-management, assess treatment compliance and side effects, and systematically monitor clinical results;
  - communicate information about treatment and clinical evolution to the doctor in charge of the therapeutic plan; and
  - facilitate coordination between patients, and suppliers of primary care and specialized psychiatric care.
- Improvements in the primary care-psychiatry interface.

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A depression management handbook was also available. It contained chapters on the detection and diagnosis of depression, use of the Patient Health Questionnaire (PHQ-9) as a tool for diagnosing depression and monitoring depression symptoms, the risk of suicide, how to draft a therapeutic plan based on scientific evidence (including a treatment algorithm to assist the doctor in decision-making with regard to antidepressant treatment), procedures for coordinating and liaising with the psychiatric services, the role of nursing and nurse–doctor coordination procedures, and the psychoeducation of the patient.

2.6.2. Staff roles doctors

Doctors were responsible for detecting and diagnosing depressive disorders in their patients, assessing depression severity, assessing comorbidity and suicidal risk, establishing a therapeutic plan and making any necessary adjustments (i.e., changing the antidepressant, consulting a psychiatrist, or requesting a referral) in response to the clinical evolution.

2.6.3. Staff roles nurses and case management

Nurses acted as case managers. They coordinated and integrated the healthcare management process to ensure continuity throughout the healthcare process, among the various staff members (doctors, nurses, psychiatrists, family members), and with any clinical care for frequent physical comorbidities (cardiovascular diseases, diabetes, chronic pain, etc.). Nurses were responsible for clinically monitoring the patients, encouraging adherence to treatment and providing psychoeducational assistance for patients and their families.

2.6.4. Guideline based clinical care

The therapeutic aspects of the programme were based on the recommendations of the NICE guide for the management of adult depression (NICE, 2008) and of the guide for the management of depression of the Spanish national health system (Avalia-t, 2008), when it became available. The initial therapeutic approach bore in mind the baseline severity of the depressive episode. Antidepressants were not recommended for the initial treatment of mild depression, but they were considered as an option for those patients with mild depression that was not resolved spontaneously or with measures of support of low intensity. In moderate or severe depression, antidepressants were considered as an option in all patients. Selective serotonin reuptake inhibitors were recommended as first-choice drugs.

In those cases that the response to the initial treatment of the depressive episode was not satisfactory, the recommendations were: re-assessment of the diagnosis and treatment compliance, increase in the dose or change of the antidepressant. Once remission had been achieved, all patients were advised to continue the treatment for six months to prevent relapses. Some patients with a high risk of recurrence were advised to extend the treatment for two years or more. The programme promoted systematic clinical monitoring through the PHQ-9, which was administered on each nursing visit. The scores were transferred to a monitoring sheet and used by the doctor to make suitable therapeutic decisions depending on the evolution of the depressive symptoms.

2.6.5. Support to treatment adherence

To improve adherence to the treatment, the programme included a structured intervention that was applied by nurses, who had to assess whether the patient had been able to initiate and continue treatment, identify difficulties or obstacles to compliance, and help resolve any problems.

2.6.6. Scheduled contact with doctors and nurses

The programme established a recommended calendar for doctor's and nurse's visits with the patient. In the initial stage, patients had to be seen one and two weeks after the beginning of the programme and then monthly until the remission of the depressive episode. In the continuation and maintenance stages, patients had to be seen every two or three months. However, the follow-up visits can be tailored to the patient and the evolution of the depression.

The content of the nurses' visits was highly structured: adherence to the therapeutic plan was systematically evaluated, the possible adverse effects of the treatment were identified and the clinical evolution of the patient was assessed through systematic use of the PHQ-9. All the information was recorded and made available to the doctors in charge so they could use it to take treatment decisions. The programme procedures were integrated into normal nursing tasks and depression management was regarded as a competence of nursing rather than an additional task. Routine coordination and communication between nurses and general practitioners was established.

2.6.7. The primary care psychiatry interface

Although the specific scope of the programme was primary care, it improved the primary care/psychiatric care interface by ensuring the continuity of the healthcare process that began in primary health care and which then went on to require specialist intervention. An enhanced procedure was implemented for cross-consultation and referrals. The recommendation and the aims of the referral were explained to the patient so that expectations were realistic. And whenever patient care was shared between a general practitioner and a psychiatrist, the responsibility for the treatment and monitoring of the patient were clearly established to prevent any gaps in the care.

2.6.8. Patient and family education by nurses

The nurses provided patients with a personalised programme of psychological and educational support taught on a one-to-one basis. To help patients to overcome the stigma that is often associated with depression, they were given information that placed particular emphasis on the prevalence and pathological nature of the disorder, focused on the reality of the treatment and its expectations, and stressed the importance of therapeutic compliance. Practical advice was given on non-specific self-management strategies, particularly with regard to adherence to treatment, social and family relationships, unjustified self-criticism and self-esteem. Family or friends were encouraged to become active in the therapeutic process. A booklet with these educational contents was given to each patient.

2.7. Usual care

The doctors in these centres use their own criteria to attend depressed patients and are allowed to use all available resources available. Although the detection and diagnosis of depression are not included in the evaluation, the doctors in the control group are given a training session on diagnosing and detecting depression just as the doctors in the intervention group are.

2.8. Measurements

The outcomes were monitored by structured questionnaires – the primary outcome was assessed first – conducted on the phone by a blinded interviewer. The follow-up interviews took place at baseline and at 3, 6 and 12 months.

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2.8.1. Main outcome variables

The main outcome variables are the severity of the depression symptoms as a continuous variable and the treatment response and remission rates, which are calculated from the former. The depressive symptoms were measured using the PHQ-9 (Spitzer et al., 1999; Diez-Quevedo et al., 2001), which consists of nine questions based on the DSM-IV criteria for a major depressive episode. PHQ-9 scores between 10 and 14 indicate a mild level of depression, scores between 15 and 19 indicate moderate major depression, and scores of 20 or above indicate severe major depression. Telephone administration of the PHQ-9 is a reliable procedure (Pinto-Meza et al., 2005).

Clinical remission is defined as virtually complete relief of symptoms and return to full functioning, and is the optimal goal of the initial treatment phase (Keller, 2003). A PHQ-9 score <5 is an operational indicator of clinical remission (Lowe et al., 2004) and response is defined as a 50% reduction in the severity of the symptoms measured with the PHQ-9 at baseline (Keller, 2003).

Health-related quality of life was measured with the SF-12 Health Questionnaire which provides two scores: the physical component summary (PCS) and the mental component summary (MCS) (Gandek et al., 1998; Vilagut et al., 2008).

2.8.2. Secondary variables and effect modifiers

At baseline we measured the severity of the physical comorbidity using the Duke Severity of Illness Checklist (DUSOI) (Parkerson et al., 1993; Martínez et al., 1998), the psychiatric comorbidity using the dysthymia and anxiety sections of the Primary-Care Evaluation of Mental Disorders (PRIME-MD) (Spitzer et al., 1994; Baca et al., 1999), the length of the current depressive episode, and the previous history of depression. We also collected sociodemographic data.

In the follow-up we measured the continuity of antidepressant treatment and the number and type of primary care and psychiatric visits for depression or related health problems. The patients' satisfaction with the care received is evaluated using a single item (a Likert scale with five response options from "very satisfied" to "very dissatisfied") (Ware and Hays, 1988).

2.9. Statistical methods

We assumed a remission rate of 30% in the control group (Katon et al., 1999) and hypothesized that the difference in the intervention group would be $\geq 16\%$. Assuming an α level of 0.05, a power of 80%, 15% of dropouts, and considering that randomization was done at primary care centre with an anticipated intracluster correlation coefficient (ICC)=0.01 (Adams et al., 2004), the resulting sample size was 402 subjects.

The outcomes of the intervention were analysed at patient level. We analysed our data on an intention-to-treat basis. To evaluate the effect of the intervention on the dichotomous variables, we used multilevel mixed-effects logistic regression (adjusted for the effect of cluster aggregation) and estimated the Odds Ratio (CI 95%) of the intervention group with respect to the control group as the measure of the effect. To measure the effect on the continuous variables we used random-effects (cluster) linear regression and estimated the difference in the adjusted means (CI 95%) between the intervention group and the control group. For the main variables we calculated the ICC (Merlo et al., 2006). These analyses were carried out with the data available and using no imputation method for the missing data. In all cases we considered $p<0.05$ to be statistically significant. For these calculations we used the STATA IC/11.0 and SPSS 15.0 software.

Table 2
Baseline characteristics of participating centres and doctors according to the study group.

	Intervention group	Usual care group
Participating primary care centres[a]	$N=10$	$N=10$
Number of doctors employed per centre (mean and SD)	10 (5.8)	13.3 (4.4)
Participating doctors at each centre (mean and SD)	3.9 (2.0)	3.9 (1.9)
Urban location (n/N)[b]	5/10	7/10
Psychiatrist available at the centre[c] (n/N)	2/10	1/10
Participating doctors	$N=39$	$n=39$
Gender: Female (n/N & %)	28/39 (71.8%)	25/39 (64.1%)
Age (mean and SD)	42.2 (8.5)	40.6 (6.8)
Years of professional practice (mean and SD)	17.3 (8.5)	16.1 (7.2)

[a] All the centres remained as participants in the entire study.
[b] n=number of people with this characteristic, N=total number of sample population.
[c] Some centres are participating in a pilot programme of support to primary care in the area of mental health that makes a part-time psychiatrist available at the centre itself.

3. Results

A total of 78 family physicians from 20 primary care centres took part in the study (see Table 2). They recruited 367 patients, of whom 338 participated in the baseline assessment. In the intervention group the mean number of patients per centre was 18.9 (SD: 9.8) and in the control group 14.9 (SD: 9.0). At 12 months, this number was 302 patients (89% participation rate) (Fig. 1). There were no differences in baseline severity of depression, age or sex between the patients who dropped out and those who did not.

Overall the mean baseline score of the PHQ-9 was 17.9 (SD: 5.0), 49% had previous history of depression and 31% had a long depressive episode (≥ 6 months). A total of 81% presented psychiatric comorbidity. At the patient level, there were no significant differences between the baseline characteristics of the two groups except in the prevalence of the generalized anxiety disorder, which was higher in the intervention group (Table 3).

3.1. Clinical outcomes

The severity of the depressive symptoms decreased in both groups but the evolution was significantly more satisfactory in the intervention group at 3 and 6 months. At 12 months, however, the trend was still slightly more favourable in the intervention group but less so, and it was not statistically significant. The response and remission rates were higher in the intervention group at 3, 6 and 12 months (differences between 13% and 21%). The mental health component of quality of life evolved more satisfactorily in the intervention group in parallel to a clinical improvement in the depression, whereas the physical health component remained stable in both groups throughout the study (Table 4).

3.2. Process of care outcomes

We found no significant differences in the number of visits patients made to the family doctor, the psychiatrist or the psychologist because of the depression, but the patients in the intervention group did make more visits to the nurse. The proportion of patients still taking antidepressants at 6 months

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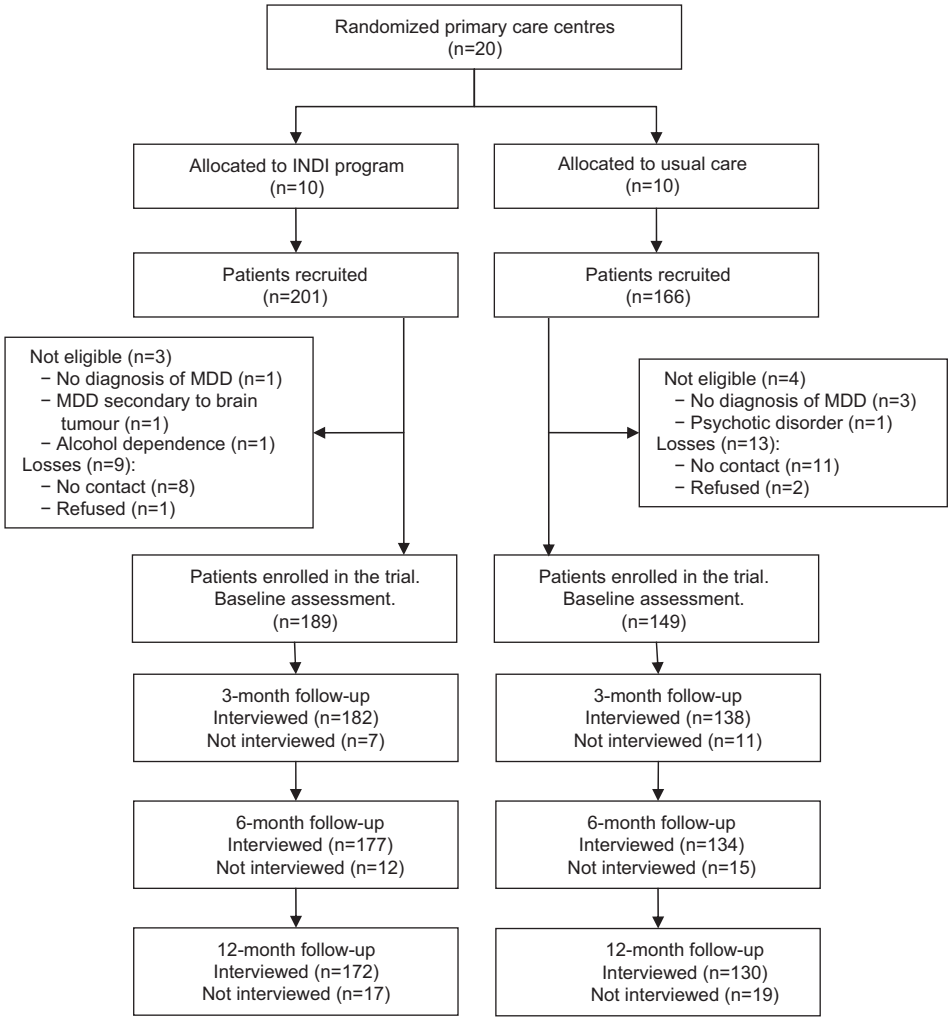

Fig. 1. Flowchart: randomization of centres, and sampling and monitoring of patients.

was higher in the intervention group ($p=0.017$). The degree of satisfaction with care was very high in both groups (Table 5).

4. Discussion

This study shows that clinical outcomes – i.e., less depression severity, higher response and remission rates, and improved functional status – were better in patients being treated at primary care centres where the intervention was applied. In accordance with recent European studies (Gensichen et al., 2009; Richards et al., 2008) this trial shows that the models for managing depression developed in the USA (Gilbody et al., 2006) can be transferred to other health systems.

In a study that was methodologically similar to ours, Dietrich et al. (2004) reported a standardized mean difference (SMD, the difference of the means of both groups divided by the pooled standard deviation) in the severity of depressive symptoms of 0.29 after a six-month monitoring period. In our study it was 0.35 at six months. These figures are conventionally interpreted as small effects (Kazis et al., 1989). Generally speaking, the effect of our intervention on the reduction of depressive symptoms at six months is comparable to the effect reported in the meta-analysis by Gilbody et al., (2003) (SMD: 0.25 at six months and 0.31 at 12 months). In this meta-analysis, in those interventions that were effective at 6 months the effect is maintained in similar parameters at 12 months. In our study we found that after 12 months of monitoring the effectiveness of the intervention is maintained in terms of response and remission rates, while for the severity of depression the difference did not reach statistical significance.

Two features of the study design suggest that the effect will not be of any great size: in the first place, the intervention assessed is intentionally lacking in intensity – so that it is easier to implement in real conditions – and, in the second place, the intervention is compared with the habitual treatment (an active intervention). Even so, from the public health and clinical perspective, the benefit of the intervention is of some importance considering the high prevalence and the morbidity of depression in primary care (Aragonès et al., 2004; Roca et al. 2009).

It is difficult to determine how each of the components of the complex models of depression management contributes to the overall effectiveness of the intervention, although some have pointed to adherence to the treatment, systematic monitoring by case managers and specialized support as being the determining factors (Gilbody et al., 2003, 2006; Bower et al., 2006). The aim of the study was not to determine the individual contribution of the interventions in the model to the overall efficiency, but we identified some differences in the care process that may be associated with the better clinical outcomes. We observed a greater tendency to persist with the antidepressant treatment in the intervention group. We also observed that more visits to the

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Table 3
Baseline characteristics of the sample of patients according to the study group.

	Intervention group ($n=189$)	Usual care group ($n=149$)	
	n (%)[a]	n (%)[a]	p-value[b]
Gender: Female	153 (81.0%)	115 (77.2%)	0.396
Age (mean and SD)	47.5 (14.5)	47.8 (14.9)	0.857
Marital status			
Single	16 (8.5%)	20 (13.4%)	0.403
Married/coupled	129 (68.3%)	100 (67.1%)	
Divorced/separated	27 (14.3%)	20 (13.4%)	
Widowed	17 (9.0%)	9 (6.0%)	
Level of education			
No studies	20 (10.6%)	19 (12.8%)	0.843
Primary	74 (39.2%)	59 (39.6%)	
Lower secondary	36 (19.0%)	22 (14.8%)	
Upper secondary	43 (22.8%)	37 (24.8%)	
University	16 (8.5%)	12 (8.1%)	
Social class[c]			
I	11 (6.0%)	4 (2.7%)	0.083
II	7 (3.8%)	4 (2.7%)	
III_N	46 (25.0%)	34 (23.1%)	
III_M	63 (34.2%)	38 (25.9%)	
IV	31 (16.8%)	42 (28.6%)	
V	26 (14.1%)	25 (17.0%)	
Currently working	114 (60.3%)	88 (59.1%)	0.823
Severity of depression (PHQ-9[d] score; mean and SD)	18.10 (5.20)	17.66 (4.80)	0.429
Previous episodes of depression	98 (51.8%)	69 (46.3%)	0.313
Length of the current episode of depression			
Less than 1 month	30 (15.9%)	18 (12.1%)	0.338
1 to 6 months	97 (51.3%)	88 (59.1%)	
6 months or more	62 (32.8%)	43 (28.9%)	
Psychiatric comorbidity			
Dysthymic disorder	75 (39.7%)	62 (41.6%)	0.720
Panic disorder	30 (15.9%)	24 (16.1%)	0.953
GAD[e]	98 (51.9%)	60 (40.3%)	0.034
Anxiety disorder NOS[f]	30 (15.9%)	32 (21.5%)	0.186
Physical comorbidity (DUSOI[g] score; mean and SD)	28.1 (28.1)	28.7 (27.8)	0.843
Health related quality of life (mean and SD)			
SF-12 MCS[h]	22.27 (9.05)	22.73 (10.44)	0.533
SF-12 PCS[i]	47.48 (10.98)	48.24 (11.24)	0.661

[a] Unless stated otherwise.
[b] T-test for continuous variables and Chi square test for categorical variables.
[c] Social class based on occupation (British Registrar General's scale).
[d] Patient health questionnaire.
[e] Generalized anxiety disorder.
[f] Not otherwise specified.
[g] Duke Severity of Illness Scale.
[h] Mental health summary.
[i] Physical health summary.

nurse were made by patients in the intervention group, which we interpret as an indicator of more intensive clinical monitoring: visits to the nurse provide structured content with systematic clinical monitoring, promoting therapy compliance and delivering psychological and educational support.

4.1. Limitations

This study has several limitations that need to be borne in mind when interpreting the results. First, the recruitment procedure may be a source of selection bias. In some studies the depressed patients are detected by means of a screening process carried out by the research team, whereas in our trial the physicians detected and diagnosed the patients and decided whether to include them. This method of selecting and recruiting patients is similar to that used in real caring practice in Spain in which systematic screening for detecting depression is neither recommended nor performed (Avalia-t, 2008), but we cannot discount a selection bias (for example, they may have included the patients who were more motivated by the treatment or easiest to deal with). Despite this, the baseline characteristics of the patients assigned to both study groups are comparable except for a greater prevalence of generalized anxiety disorder in the intervention group. This, however, is by no means an advantage for the intervention group because comorbidity with this disorder is associated with a worse evolution of depression (Penninx et al., 2011). What is more, the sample seems to be representative of primary-care depressed patients in Spain, who tend to experience moderate depressive episodes, a considerable proportion of recurrent and long episodes, and a high percentage of psychiatric comorbidity (Aragonès et al., 2004). Second, the diagnosis of major depression in patients was made according to the clinical assessment the participating doctors, and the PHQ-9 was used to ensure that the DSM-IV and severity criteria were complied with, but there was no independent diagnostic assessment with a standardized diagnostic interview. This may generate some uncertainty about the reliability of the diagnosis

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Table 4
Clinical outcomes in depressed patients being managed with depression management model versus usual care.

Outcomes	Intervention group	Usual care group	Between group difference (CI 95%)[e]	*p*-value	ICC[g]
Depression severity[a]					
3 months	9.48 (7.14)	11.90 (6.97)	−2.49 (−4.38 to −0.61)	0.009	0.025
6 months	7.97 (7.22)	10.46 (7.22)	−2.51 (−4.27 to −0.51)	0.009	0.010
12 months	7.15 (7.11)	8.78 (6.99)	−1.76 (−3.53 to 0.02)	0.053	0.013
			Odds ratio (CI 95%)[f]		
Response[b]					
3 months	53.8% (98/182)	37.0% (51/138)	2.0 (1.3 to 3.1)	0.003	<0.001
6 months	61.0% (108/177)	45.5% (61/134)	1.9 (1.2 to 2.9)	0.007	<0.001
12 months	66.9% (115/172)	51.5% (67/130)	1.9 (1.2 to 3.1)	0.011	0.002
Remission[c]					
3 months	31.9% (58/182)	15.2% (21/138)	2.6 (1.5 to 4.6)	0.001	<0.001
6 months	45.2% (80/177)	23.9% (32/134)	2.7 (1.6 to 4.4)	<0.001	0.003
12 months	48.8% (84/172)	35.4% (46/130)	1.8 (1.1 to 2.9)	0.026	0.006
			Between group difference (CI 95%)[e]		
SF12 mental health[d]					
3 months	39.20 (15.04)	33.09 (14.14)	6.17 (2.80 to 9.54)	<0.001	0.004
6 months	42.39 (14.66)	36.66 (15.69)	5.81 (1.90 to 9.73)	0.004	0.015
12 months	43.39 (14.12)	38.49 (15.32)	5.10 (1.11 to 9.10)	0.012	0.017
SF12 physical health[d]					
3 months	46.67 (9.72)	47.12 (10.30)	−0.43 (−2.88 to 2.02)	0.731	0.012
6 months	47.58 (9.32)	47.45 (9.72)	0.13 (−2.27 to 2.53)	0.912	0.015
12 months	47.06 (10.19)	46.99 (10.30)	0.16 (−2.52 to 2.84)	0.908	0.017

Numbers are percentages (number of patients/total number) unless stated otherwise.
[a] PHQ-9 score, mean (SD).
[b] Response: decrease ≥ 50% in PHQ-9 score from baseline.
[c] Remission: PHQ-9 < 5.
[d] Mean (SD).
[e] Using random-effects linear regression, adjusted by cluster.
[f] Using multilevel mixed-effects logistic regression, adjusted by cluster.
[g] CC: Intracluster correlation coefficient.

Table 5
Process of care variables in depressed patients being managed with the depression management model versus usual care.

Process of care variables	Intervention group	Usual care group	Between group difference (CI 95%)[c]	*p*-value
Primary care physician visits for depression in 12 months (mean and SD)	8.2 (7.1)	8.2 (7.8)	−0.19 (−2.25 to 1.86)	0.853
Primary care nursing visits for depression in 12 months (mean and SD)	5.0 (4.9)	1.9 (3.7)	2.68 (1.20 to 4.16)	<0.001
Visits with the psychiatrist for depression in 12 months (mean and SD)[a]	1.1 (4.1)	0.6 (1.4)	0.08 (−0.29 to 0.45)	0.669
Visits with the psychologist for depression in 12 months (mean and SD)[a]	2.3 (5.7)	1.7 (3.9)	0.28 (−0.35 to 0.90)	0.389
			Odds ratio (CI 95%)[d]	
Persistence of treatment with antidepressants (*n* and %)				
At 3 months	148 (81.3%)	104 (75.4%)	1.29 (0.62 to 2.68)	0.495
At 6 months	138 (78.0%)	88 (65.7%)	1.85 (1.12 to 3.06)	0.017
At 12 months	107 (62.2%)	73 (56.2%)	1.29 (0.81 to 2.04)	0.289
Patient's opinion of the care received (satisfied or very satisfied)[b] (*n* and %)				
At 3 months	172/182 (94.5%)	128/137 (93.4%)	1.08 (0.32 to 3.69)	0.897
At 6 months	167/175 (95.4%)	124/134 (92.5%)	1.68 (0.65 to 4.39)	0.287
At 12 months	167/172 (97.0%)	122/130 (93.8%)	1.81 (0.40 to 8.21)	0.441

[a] Includes visits with both public and private physicians.
[b] Measured using a Likert scale with the options: very dissatisfied, dissatisfied, fair, satisfied and very satisfied.
[c] Using random-effects linear regression, adjusted by cluster.
[d] Using multilevel mixed-effects logistic regression, adjusted by cluster.

of major depression in the patients who have taken part in the trial. Third, the intervention is carried out on the basis of a therapeutic plan in which evidence-based psychotherapy is not provided even though it is therapeutically valid (NICE, 2008; Avalia-t, 2008) and is included in other models of disease management (Sherbourne et al., 2001). In the Spanish primary care, psychotherapy is not readily available and, even though it could have been implemented in the context of a research project, it would have been difficult to generalize in real practice. Fourth, some difficulties in the recruitment of patients meant that we could not draw up the sample that we had initially envisaged.

5. Conclusion

The programme for managing depression in primary care was designed so that – if effective – it could be applied in habitual care and be straightforward to implement. The multi-component programme is simple and readily available, and requires the staff available to be organized and optimized rather than extra resources to be supplied. Its better clinical outcomes and its feasibility indicate that it could be recommended for implementation in the Spanish public health system. It can also be added to the body of scientific evidence (Gensichen et al., 2009; Richards

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et al., 2008) that can be used to propose similar interventions in analogous public health systems.

Conflict of interest

E Aragonès have received honorarium as research advisor, and meeting expenses, from Lilly. All authors declare no other relationships, interests or activities that could appear to have influenced the submitted work.

Contributors

The authors' contributions are: EA is the principal investigator and developed the original idea for the study. EA is the guarantor of the study. The study design was further developed by EA, AC, JLP and GL. The following have intervened in the design and the planning of the intervention that was evaluated: EA, AC, JLP, PC, SF and JMH (training of the participating doctors, support materials - Depression Management Handbook); WB and GL (nurses' interventions), JMH and EA (patients health education), EA and PC (primary care/specialised level interface). JLP and EA developed the statistical methods. All authors have read and corrected draft versions, and approved the final version.

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Appendix A. Supplementary information

Supplementary data associated with this article can be found in the online version at doi:10.1016/j.jad.2012.05.020.

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