Embracing the perspectives of older adults in organising and evaluating person-centred and integrated care

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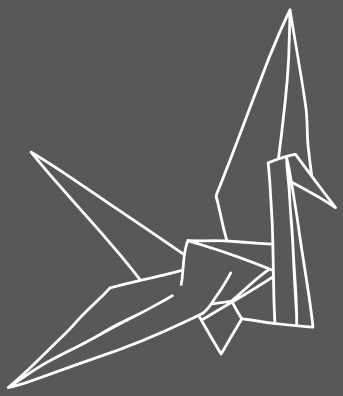

Effects of a population-based, person-centered and integrated care service on health, wellbeing, and self-management of community-living older adults: a randomized controlled trial on Embrace

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5

ABSTRACT

Objectives ♦ To evaluate the effects of a person-centered and integrated care and support service for community-living older adults ('Embrace') on patient-reported outcomes at 12 months.

Design ♦ Randomized controlled trial.

Setting ♦ Fifteen general practitioner (GP) practices in the Netherlands.

Participants ♦ Older adults (≥75 years, n=1456) registered with participating GPs were included (49% response) and stratified into three risk profiles: Robust, Frail, and Complex care needs, and randomized to Embrace (n=747) or care as usual (CAU, n=709). Follow-up measurements were completed by 1131 participants (Embrace: 76%; CAU: 79%).

Intervention ♦ Embrace is based on the Chronic Care Model and a Population Health Management model and provides person-centered and integrated care and support to community-living older adults. The intensity and focus of care and support depends on the risk profile.

Measurements ♦ Outcomes were recorded in the domains 'Health,' 'Wellbeing,' and 'Self-management.' The EuroQol-5D-3L and visual analogue scale were used for the domain 'Health,' as were the INTERMED for the Elderly Self-Assessment, Groningen Frailty Indicator, and the Katz-15. The Groningen Well-being Indicator and two quality of life questions measured 'Wellbeing.' The Self-Management Ability Scale version 2 and Partners in Health scale for older adults (PIH-OA) were used for 'Self-management.' Data were analyzed with multilevel mixed model techniques using intention-to-treat and complete case analyses, for the whole sample and per risk profile.

Results ♦ No major differences were found between Embrace and CAU, apart from some minor effects. Embrace participants showed a significantly greater improvement on the PIH-OA Knowledge subscale (95% CI 0.12 to 0.85, p=0.009, effect size (ES)=0.14), but a greater deterioration in overall activities of daily living (ADL) (95% CI 0.00 to 0.31, p=0.047, ES=0.10) and physical ADL performance (95% CI 0.02 to 0.16, p=0.011, ES=0.13) compared to CAU. This heterogeneous picture was also found in the risk profiles. Complete case analyses showed comparable results.

Conclusion ♦ This study found no clear benefits to receiving person-centered and integrated care and support for twelve months for the domains health, wellbeing, and self-management in community-living older adults.

INTRODUCTION

Older adults prefer to age in place and to participate in society.[1-3] However, this preference is compromised by age-related health problems,[4,5] leading to an increasing level of dependency and service-use, a growing sense of loss of control and insecurity, and the threat of ultimate relocation to an institution.[6-9] The challenge is to stimulate aging in place and to support older adults so that they can better deal with the negative consequences of ageing.[6,7] The current healthcare systems are insufficiently able to address these challenges for many aging individuals and need to be reorganized in such a way that they promote aging in place.[10]

A model of increasing importance and popularity in healthcare reform is the Chronic Care Model (CCM).[11-13] The CCM addresses the needs of chronically ill patients by offering comprehensive, person-centered, proactive, and preventive care and support. It encourages patients to be informed and activated, thereby helping them deal with the consequences of their diseases.[14] Two randomized controlled trials on the CCM targeted older adults, but both have limitations regarding their study populations.[15,16] In order to provide care and support to the total community-living population of older adults, the CCM can be combined with a Population Health Management (PHM) model. PHM models assess an entire population in a community and not just those in need of urgent care. PHM-based care and support can be targeted to individual needs by classifying population subgroups into risk profiles.[17]

Embrace is an integrated care service based on the complete CCM and a PHM model (Kaiser Permanente [KP] Triangle)[13] targeting all community-living older adults.[18] Embrace's goal is to support older adults to age in place by providing person-centered, integrated, proactive, and preventive care and support. Embrace classifies older adults into three risk profiles based on the complexity of their care needs[19] and their level of frailty.[20,21] Care and support are tailored to the risk profile and the needs of the older adults. A qualitative study of Embrace has already showed promising results.[6]

In this study, we intend to evaluate the effectiveness of Embrace on patient-reported outcomes. We considered these outcomes important to aging in place and to participation in society. They are related to the domains 'Health,' 'Wellbeing,' and 'Self-management.'

METHODS

Study design and setting

We conducted a randomized controlled trial (RCT) with stratification into risk profiles and balanced allocation to the intervention (Embrace) or care as usual (CAU) groups, within general practitioner (GP) practices. The RCT was performed in three semi-rural municipalities in the province of Groningen (in the northern Netherlands). Participants were followed for twelve months between January 2012 and March 2013. The Medical Ethical Committee of the University Medical Center of Groningen has assessed the study proposal and concluded that approval was not required (Reference METc2011.108). All participants gave informed consent. The study protocol has been published previously.[18]

Study population and procedure

First, we invited all GPs working in the three municipalities to participate in the study. Recruitment stopped after fifteen GPs – proportionally distributed according to the size of the municipalities – agreed to participate as they had enough eligible participants to obtain the sample size needed. Next, community-living older adults aged 75 and over who were registered with one of the participating GPs were invited to participate. Exclusion criteria at baseline were long-term admission to a nursing home, receiving an alternative type of integrated care, or participating in another research study. Eligible participants received a letter from their GP with general information about Embrace and the study. After having provided informed consent, participants completed self-report questionnaires at baseline (T0: Oct-Dec 2011) and twelve months after starting (T1: Jan-March 2013), with support by a family member, friend or volunteer if needed. We sent reminders to non-respondents, followed by telephone calls to the persistent non-respondents. Respondents who submitted questionnaires with missing values were called by help desk assistants or visited by volunteers to complete the missing items.

Stratified randomization and blinding

We stratified participants into three risk profiles, using results of the baseline assessment of complexity of care needs (measured using the INTERMED for the Elderly Self-Assessment [INTERMED-E-SA])[19] and the level of frailty (measured using the Groningen Frailty Indicator [GFI]).[20] These risk profiles are 'Complex care needs' for participants with complex care needs and at risk for assignment to a hospital or nursing home (INTERMED-E-SA≥16), 'Frail' for participants at risk of complex care needs (INTERMED-E-SA<16 and a GFI≥5), and 'Robust' for participants at risk for the consequences of aging (INTERMED-E-SA<16 and GFI<5).

After stratification, we performed an anonymized, computerized balancing process within each GP practice to equally distribute participants to Embrace or CAU, taking into account predetermined patient characteristics deemed capable of affecting intervention outcomes.[22]

Intervention: Embrace

Embrace (in Dutch: *SamenOud* [aging together]) is a person-centered and integrated care service for community-living older adults. A multidisciplinary Elderly Care Team – consisting of a GP, a nursing home physician,[23] and two case managers (district nurse and social worker) – provides care and support to older adults.[18]

The intensity, focus, and individual or group approach of the care and support depended on the participant's risk profile. We invited all participants to follow a self-management support and prevention program focusing on staying healthy and independent for as long as possible. The program included regular Embrace community meetings, in which self-management abilities were encouraged and during which local healthcare and welfare organizations provided information on health maintenance, physical and social activities, and dietary recommendations. In addition, frail people and those with complex care needs received individual support from a case manager. They jointly developed an individual care and support plan targeting all health-related problems, which had to be agreed upon by the Elderly Care Team before implementation. The case managers monitored changes in the medical, psychosocial, or living situation, and navigated the plan's delivery. The Elderly Care Team discussed and evaluated the participants' health status and social situation in monthly meetings. If necessary, they took proactive steps in dialogue with participants to prevent deterioration. People with a 'Robust' profile were encouraged to contact the team in the event of changes in their health or living situation. Details of the implementation of Embrace have been published in the study protocol.[18]

Care as usual

The control group received care as usual as provided by their GPs and local health and community organizations. Municipalities are in charge of social care, disease prevention, and health promotion. Once a health problem is found, patients enter the health care system – in most cases with a visit to their GP. GPs act as gatekeepers for specialized services in the Dutch healthcare system: patients need a referral to enter specialized medical care. The mean number of GP visits increases with age from six visits per year at age 45-64 to fifteen visits per year for people aged 75 years and older [24], and a regular GP visit takes about ten minutes.[25]

Patient-reported primary and secondary outcomes

We used eight different questionnaires to assess patient-reported outcomes in three domains: 'Health,' 'Wellbeing,' and 'Self-management,' with primary and secondary patient-reported outcomes differing per risk profile, as we expected problems to vary per profile (see Table 1).[18]

TABLE 1 ♦ Primary and secondary measurement instruments per risk profile

	Complex care needs		Frail		Robust	
	Primary	Secondary	Primary	Secondary	Primary	Secondary
Health						
EQ-5D-3L	X		X		X	
INTERMED-E-SA	X			X		X
GFI	X		X			X
Katz-15		X		X		X
Wellbeing						
GWI		X		X		X
QoL		X		X		X
Self-management						
SMAS-30		X	X		X	
PIH-OA		X	X		X	

EQ-5D-3L = EuroQol-5D-3L; GWI = Groningen Well-being Indicator; Katz-15 = Modified Katz ADL index; PIH-OA = Partners in Health scale for older adults; QOL = quality of life; SMAS-30 = Self-Management Ability Scale version 2.

Health

The 'Health' domain included the outcomes 'Health status,' 'Complexity of care needs,' 'Level of frailty,' and 'Limitations in Activities of Daily Living (ADL).' We measured *Health status* using the EuroQol-5D three-level version (EQ-5D-3L), which is a short self-report questionnaire measuring health in five dimensions [26,27]. Besides, the EQ Visual Analogue Scale (EQ-VAS) was administered.[28]

We measured *Complexity of care needs* using the INTERMED-E-SA, which includes twenty questions in the biological, psychological, social, and healthcare domains.[19]

We measured *Level of frailty* in the physical, social, cognitive, and psychological domains with the GFI self-report version (fifteen items).[20]

We measured *Limitations in ADL* using the Katz-15, which measures independence in six physical ADLs (PADL), seven instrumental ADLs (IADL), and two additional ADL items. We calculated ADL performance as the total number of disabilities.[29] Subscale scores were calculated for PADL and IADL.

Wellbeing

The 'Wellbeing' domain included 'Wellbeing' and 'Quality of Life' (QoL). *Wellbeing* was measured using the Groningen Well-being Indicator (GWI), covering eight sources of wellbeing in daily experiences: enjoying eating and drinking, sleeping and resting well, having good relationships and contacts, being active, managing oneself, being oneself, feeling healthy in body and mind, and living pleasantly. Participants had to indicate whether each source of wellbeing was important to them and, if so, whether they were satisfied with that source. The Well-being Satisfaction Score is the number of important sources divided by the number of satisfactory sources.[30]

We assessed *QoL* using two items derived from the self-perceived health questions of the RAND-36.[31] The first item measured self-rated QoL, while the second item compared the current self-rated QoL with QoL a year earlier. Both questions are rated on a 5-point scale ranging from 1 to 5.

Self-management

The 'Self-management' domain included 'Self-management ability' and 'Self-management knowledge and behavior'. We assessed *Self-management ability* using the Self-Management Ability Scale (SMAS-30) version 2, which contains thirty items and six subscales. The total SMAS score was calculated as the average of the subscale scores.[32,33]

We measured *Self-management knowledge and behavior* with the culturally adapted and validated version of the Partners in Health scale (PIH):[34] the PIH scale for older adults (PIH-OA).[35] The PIH-OA includes three subscales measuring eight items on an 8-point scale. Originally, we defined the PIH as a secondary outcome measurement for quality of care. However, the new, adapted version – PIH-OA – measures self-management and is therefore included in the present study.

Sample size

We used the primary outcome *Health status* (EQ-VAS) to calculate the sample size needed.[18] We considered a change in outcome of six points (SD 14 points) on the EQ-VAS of participants in the smallest sample, i.e. the risk profile 'Frail,' clinically relevant. With a power of 80% (α=0.05, two-sided), a total number of 1062 older adults had to be included in the analysis. Taking into account an estimated non-response rate of 30% and a loss-to-follow-up rate of 30%, 2178 patients had to be invited to participate.

Statistical analyses

Differences between respondents and non-respondents were tested using Chi-square tests for categorical variables and t-tests for continuous variables. Differences in reasons for dropout in the intervention and control groups were tested using Chi-square tests.

We assessed differences in change between the intervention and control groups using multilevel analyses with regression coefficients (B) with 95% confidence intervals (CI) at α=0.05 (two-sided), with adjustment for age and sex. Individual measurements (difference scores between T0 and T1) were included as the first level and GP practices as the second level. We estimated the clinical relevance of the effects using Cohen's effect sizes (ES) for statistically significant differences ($p<0.05$), with an ES of ≥0.20 reflecting a clinically relevant difference.[36,37]

We performed intention-to-treat (ITT) analyses[38] for the whole sample and per profile. Missing data were imputed at item level by multiple imputation using Bayesian techniques,[39] generating twenty imputed datasets and using group, risk profile, GP, sex, age, marital status, living situation, educational level, income, and receiving help with completing the questionnaire as covariates of the missing predictor models. Missing scale scores due to loss to follow-up were imputed using the mean change of deterioration of completed cases, as we assumed that older adults deteriorate over time.[40] This process was performed per risk profile for each scale. ITT outcomes were compared with those of complete case analyses including participants having both T0 and T1 measurements.[41]

We performed all analyses using SPSS Statistics version 23.0 and used Mplus version 7.1 to impute the data.

RESULTS

Participants

Figure 1 presents the flow of participants in the study. We included 1456 of the 2988 eligible older adults in the study and analyses (48.7%). The main reasons for not participating included having or having a partner with poor health, good health, questionnaire length, and lack of interest. Non-respondents differed from respondents (all p-values <0.01) regarding gender (more women declined to participate), age (older participants consented less often), and degree of urbanization (more rural participants declined to participate).
Table 2 shows the baseline characteristics of participants. There were no statistically significant

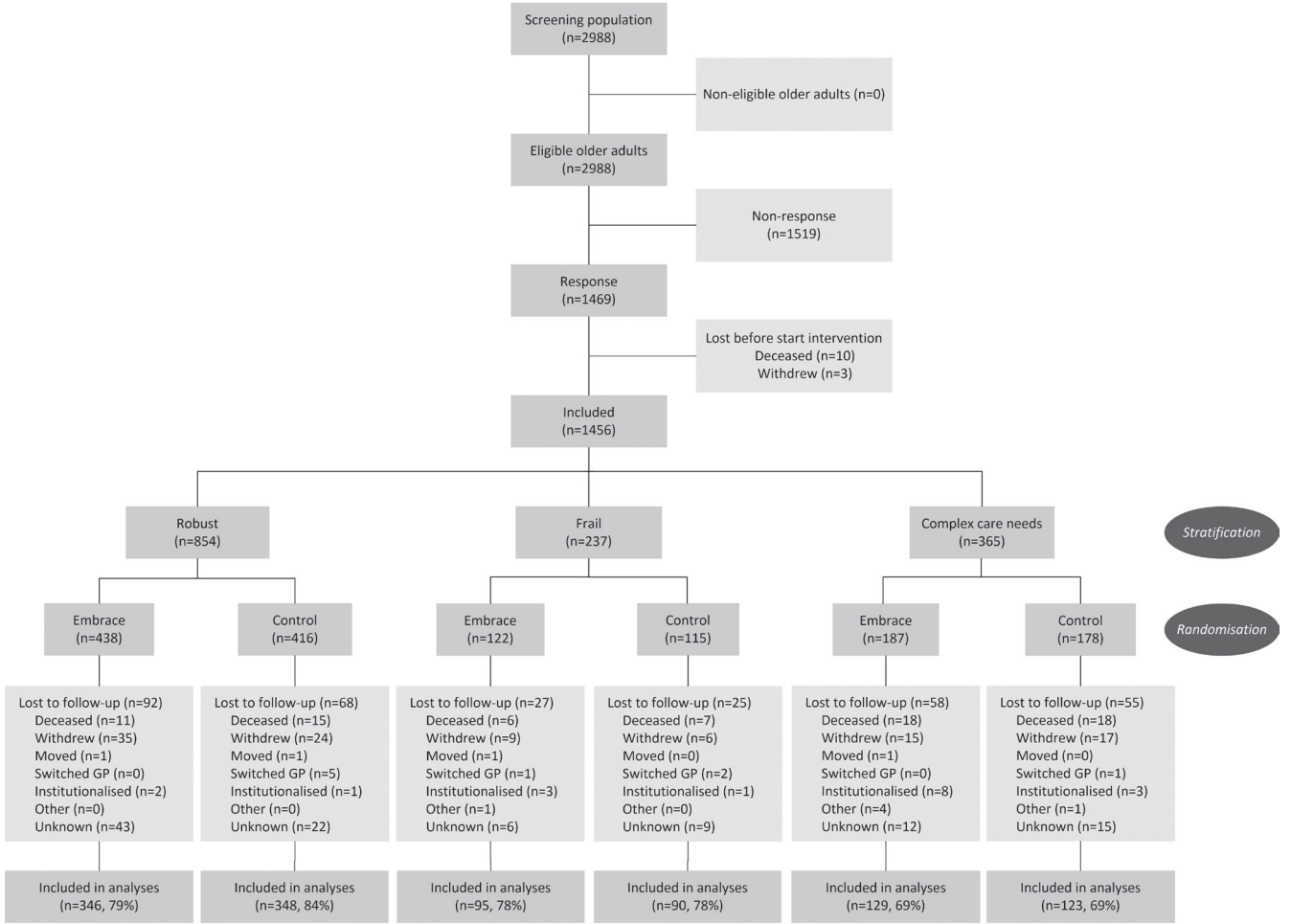

FIGURE 1 • Flowchart of participants

TABLE 2 • Background characteristics of participants (n=1456). Values are numbers (percentages) unless stated otherwise

	Whole sample (n=1456)		Complex care needs (n=365)		Frail (n=237)		Robust (n=854)	
	CAU (n=709)	Embrace (n=747)	CAU (n=178)	Embrace (n=187)	CAU (n=115)	Embrace (n=122)	CAU (n=416)	Embrace (n=438)
Age in years, median (IQR)	80.1 (76.9-83.6)	79.6 (77.1-83.7)	80.7 (77.7-84.2)	80.8 (78.1-85.4)	82.5 (77.9-86.2)	80.3 (77.3-85.7)	79.1 (76.5-82.6)	79.0 (76.6-82.4)
Female	394 (55.6)	405 (54.2)	115 (64.6)	121 (64.7)	80 (69.6)	82 (67.2)	199 (47.8)	202 (46.1)
Widowed/divorced/single	290 (41.0)	320 (42.8)	79 (44.4)	87 (46.5)	72 (63.2)	77 (63.1)	139 (33.5)	156 (35.6)
In sheltered accommodation/ home for the elderly	99 (14.0)	93 (12.5)	40 (22.6)	37 (19.9)	26 (22.8)	20 (16.4)	33 (8.0)	36 (8.3)
Low educational level[1]	374 (53.4)	370 (49.9)	116 (66.3)	106 (57.0)	69 (60.0)	66 (54.1)	189 (46.0)	198 (45.7)
Low income[2]	23 (42.4)	261 (44.1)	77 (54.2)	80 (54.1)	51 (54.8)	53 (55.8)	103 (33.2)	128 (36.7)
Number of chronic conditions, median (IQR)	2 (1-3)	2 (1-3)	3 (2-5)	3 (2-5)	3 (2-4)	3 (1-4)	1 (1-2)	1 (1-2)
Receiving home care	69 (9.8)	89 (12.1)	42 (23.9)	47 (26.4)	14 (12.4)	24 (20.0)	13 (3.2)	18 (4.1)
Receiving help with filling in the questionnaire	245 (35.0)	243 (32.8)	106 (60.2)	99 (53.8)	43 (37.7)	48 (39.3)	96 (23.4)	96 (22.1)

CAU = Care as usual; IQR = Interquartile range.
[1] Low: (Less than) primary school or low vocational training.
[2] Low: <€1350 per month.
Values are based on complete data. There were no significant differences between CAU and Embrace – neither for the whole sample nor per risk profile. This was tested using independent t-tests for continuous variables, Chi-square tests for categorical variables, and Mann-Whitney U tests for non-normally distributed continuous variables and ordinal variables.

differences in the baseline characteristics between Embrace and CAU. After twelve months, 561 (75.3%) Embrace recipients and 570 (77.0%) CAU recipients completed the follow-up questionnaire. Dropouts (n=325, 22.3%) were significantly (all p-values <0.01) older, more frail, with more complex care needs, and with poorer health. There were no significant differences in dropout rates between Embrace and CAU for the whole sample and per profile.

Differences in effects between Embrace and CAU

Whole sample

We found no clear beneficial effects of Embrace in the whole sample as compared to CAU. Regarding the *Health* domain, Embrace participants showed a significantly greater deterioration in ADL and PADL performance compared to CAU – although the trivial effect size indicated that this difference was not clinically relevant. We found no differences in the changes observed between Embrace and CAU regarding *Wellbeing* outcomes. Regarding *Self-management*, Embrace participants showed a significantly greater improvement in the 'Knowledge domain of self-management knowledge and behavior' compared to CAU, but this difference did not reach clinical relevance (Tables 3 and S1).

Complex care needs

We found no significant differences in the changes observed in the domains *Health* and *Wellbeing* after twelve months between Embrace and CAU. However, there was a significant and clinically relevant difference in change in the *Self-management* outcome 'Self-management abilities,' 'Self-efficacy beliefs,' and 'Investment behavior', as Embrace participants performed worse after twelve months, whereas those in CAU showed a small improvement (Tables 3 and S2).

Frail

We found no differences in the change observed between Embrace and CAU regarding *Health* and *Wellbeing,* but Embrace participants did show a significantly greater improvement in the 'Self-management knowledge and behavior' *Self-management* outcome, as well as in its 'Knowledge' domain, compared to CAU (Tables 3 and S3).

TABLE 3 • Patient-reported outcomes at 12-month follow-up in the Embrace study: overview of the results of the intention-to-treat multilevel analyses for the whole sample and per risk profile

			Whole sample (n=1456)				Complex care needs (n=365)				Frail (n=237)				Robust (n=854)			
	Scale scores (range)	Higher score*	Mean Δ CAU	Mean Δ Embrace	p†	ES	Mean Δ CAU	Mean Δ Embrace	p†	ES	Mean Δ CAU	Mean Δ Embrace	p†	ES	Mean Δ CAU	Mean Δ Embrace	p†	ES
Health																		
EQ-5D-3L	-0.33-1.00	+	0.00	0.00	0.670	0.02	-0.01	-0.02	0.521	0.07	0.0	-0.02	0.223	0.16	0.01	0.01	0.630	0.03
EQ-VAS	0-100	+	-0.6	-0.5	0.878	0.01	1.6	-0.1	0.323	0.10	-3.0	-1.7	0.387	0.11	-0.9	-0.4	0.511	0.05
INTERMED-E-SA	0-60	-	-0.2	-0.1	0.597	0.03	-2.6	-1.9	0.149	0.15	1.3	1.4	0.608	0.06	0.5	0.3	0.540	0.04
GFI	0-15	-	0.1	0.1	0.998	0.00	0.0	0.1	0.552	0.06	-0.7	-0.6	0.586	0.07	0.5	0.4	0.411	0.06
Katz-15	0-15	-	0.19	0.35	0.047	0.10	0.33	0.58	0.204	0.13	0.39	0.28	0.660	0.06	0.08	0.26	**0.035**	0.14
PADL	0-6	-	0.06	0.14	**0.011**	0.13	0.14	0.32	0.058	0.20	0.10	0.14	0.561	0.08	0.01	0.07	0.089	0.12
IADL	0-7	-	0.13	0.19	0.185	0.07	0.16	0.27	0.363	0.10	0.25	0.11	0.355	0.12	0.08	0.18	0.063	0.13
Well-being																		
GWI SF Score	0-1	+	-0.02	-0.02	0.892	0.01	-0.03	-0.02	0.512	0.07	0.0	-0.04	0.478	0.09	-0.02	-0.02	0.900	0.01
QoL general	0-5	-	0.10	0.08	0.636	0.02	0.14	0.17	0.587	0.06	0.09	0.12	0.818	0.03	0.08	0.03	0.289	0.07
QoL vs 1 year ago	0-5	-	0.04	0.08	0.320	0.05	0.01	-0.04	0.471	0.08	0.17	0.11	0.425	0.10	0.02	0.13	**0.018**	0.16
Self-management																		
SMAS-30	0-100	+	-0.8	-1.1	0.411	0.04	0.2	-2.0	0.015	0.26	-0.7	-0.4	0.705	0.05	-1.2	-0.9	0.664	0.03
INIT	0-100	+	-2.5	-2.3	0.709	0.02	-2.1	-2.8	0.530	0.07	-2.3	-1.7	0.658	0.06	-2.8	-2.2	0.485	0.05
SE	0-100	+	-0.9	-0.8	0.455	0.04	1.7	-2.1	**0.020**	0.24	-1.3	0.0	0.619	0.07	-2.0	-0.4	0.585	0.04
INVEST	0-100	+	0.0	-1.1	0.802	0.01	0.8	-1.3	**0.005**	0.30	0.5	-0.3	0.412	0.11	-0.4	-1.2	0.068	0.13
POSITIVE	0-100	+	0.2	-0.2	0.542	0.03	1.2	-0.2	0.217	0.13	0.5	-0.3	0.680	0.05	-0.3	-0.1	0.835	0.01
MULT	0-100	+	-0.4	-0.8	0.124	0.08	1.1	-1.9	0.126	0.16	-1.7	-1.1	0.609	0.07	-0.6	-0.2	0.383	0.06
VAR	0-100	+	-0.8	-1.3	0.461	0.04	-1.3	-3.2	0.177	0.14	0.3	1.2	0.450	0.10	-0.8	-1.2	0.649	0.03
PIH-OA scale	8-64	+	0.4	0.8	0.285	0.06	1.1	1.1	0.976	0.00	-0.8	1.7	**0.020**	0.31	0.4	0.4	0.936	0.01
Knowledge	2-16	+	0.3	0.8	**0.009**	0.14	0.3	0.8	0.113	0.17	-0.2	1.0	**0.015**	0.32	0.4	0.7	0.245	0.08
Management	2-16	+	0.0	0.1	0.691	0.02	0.2	0.2	0.969	0.00	-0.2	0.2	0.398	0.11	-0.1	-0.1	0.965	0.00
Coping	4-32	+	0.1	0.0	0.659	0.02	0.6	0.1	0.336	0.10	-0.4	0.6	0.119	0.21	0.0	-0.2	0.355	0.06

CAU = Care as usual; EQ-5D-3L = EuroQol-5D-3L; EQ-VAS = EuroQoL-5D visual analogue scale; ES = Effect size d, thresholds <0.2 trivial, ≥ 0.2- 0.5 small, ≥0.5-0.8 medium, ≥ 0.8 large; GFI = Groningen Frailty Indicator; GWI SF Score = Groningen Well-being Indicator Satisfaction Score; IADL = Instrumental Activities of Daily Living; INIT = Taking initiatives subscale; INTERMED-E-SA = INTERMED for the Elderly Self-Assessment; INVEST = Investment behaviour subscale; Katz-15 = Modified Katz ADL index; MULT = Multi-functionality of resources subscale; PADL = Physical Activities of Daily Living; PIH-OA = Partners in Health scale for older adults; POSITIVE = Positive frame of mind subscale; QOL = Quality of life; SE = Self-efficacy beliefs subscale; SMAS-30 = Self-Management Ability Scale version 2; VAR = Variety in resources subscale.
* + Higher score means improvement; - higher score means deterioration; † Values are corrected for age and sex; bold values indicate p<0.05.

Robust

We found no significant differences in the *Health* domain, except for significantly worse ADL performance compared to CAU – although this difference was not clinically relevant. Furthermore, Embrace participants showed a significantly larger deterioration in the *Wellbeing* outcome 'QoL comparison item' compared to CAU, but this difference was not clinically relevant either. We found no differences in the changes observed between groups regarding *Self-management* (Tables 3 and S4).

Missing data and sensitivity analyses

Missing scale scores ranged from 0.0% to 12.7%, with 37 of the 42 scales and subscales having less than 5.0% missing values. Sensitivity analyses with complete cases showed the same pattern of results, except for 1) a significant deterioration in PADL performance of the complex Embrace participants, and 2) a no longer significant – but still clinically relevant – improvement on the total PIH-OA score for the frail Embrace participants (Tables S5-S9).

DISCUSSION

This stratified randomized controlled trial (RCT) examined the effects of a person-centered and integrated care service for older adults, 'Embrace,' based on the Chronic Care Model (CCM) and a Population Health Management (PHM) model. We found no clear effects after receiving twelve months of care and support by Embrace on health, wellbeing, and self-management in community-living older adults.

Interpretation of findings

The care and support offered by Embrace had fewer beneficial effects – and sometimes even adverse effects – on the domains Health, Wellbeing, and Self-management than we anticipated, which confirms the heterogeneous outcomes previously reported. We only found two CCM-based RCTs which targeted older adults, but these studies only focused on people who were already frail or had complex care needs.[15,16] The 'frail older Adults: Care in Transition-study' found only small intervention effects for instrumental activities of daily living.[15] The study on Guided Care showed no significant effect on self-rated mental and physical health.[16] RCTs on other integrated care programs for community-living older adults presented mixed results. Physical function, for example, improved in some studies,[39-42] whereas it did not change in others.[43-45] In addition, the effects of integrated care on quality

of life were mixed[40,44] or null.[45] Health status of older adults also did not change after receiving integrated care.[46] The effects of individual intervention elements – for example, case management, home visits and geriatric assessment – on health-related outcomes for older people are also inconclusive.[47-53]

Our finding of no clear benefits for Embrace could be due to the duration of the intervention, the nature of the intervention, or methodological limitations. Firstly, the intervention may not have worked or may not yet have worked. We may have been dealing with an investment effect,[55] as this multifaceted and complex intervention requires a cultural change in professionals' deep-rooted working patterns, which could take more time than only twelve months. Assessment of effects in the longer term is therefore needed. Secondly, the contrast between our intervention and CAU may have been too small to detect differences over the first twelve-month period. The Dutch healthcare system is already of a quite high standard, as all inhabitants have health insurance and healthcare is easily accessible, leaving little room for improvement.[56] This was confirmed by our finding that only the frail Embrace participants showed a significant increase in self-management knowledge and behavior. These participants had received little or no care before the start of the intervention, in contrast with the complex participants, the majority of whom already received home care. Thirdly, we had to deal with the heterogeneity and instability of the older population, which increased measurement error and thus reduced the likelihood of observing effects.[57] Fourthly, the measurement instruments for health and well-being may not have been specific enough for this type of intervention and may not have been sensitive enough to detect changes in clinical practice.[58] This could explain why we did find effects on two specifically developed measurement instruments: the PIH-OA, which is a version of the PIH for the evaluation of self-management knowledge and behavior in older adults,[35] and the PAIEC,[59] which is used in another Embrace study for evaluation of perceived quality of integrated care and support.

Strengths and limitations

The strengths of this study are its design – a RCT targeting all community-living older adults – and its stratification of participants into risk profiles, thereby enabling professionals to provide patient-centered care and support. Moreover, we were able to perform predefined subgroup analyses to examine the effect of integrated care in subgroups at a higher risk of deterioration.[60]

We must also acknowledge a potential limitation. We randomized within GP practices, which increased the risk of contamination. Although we instructed GPs to provide care as usual to patients who were not assigned to the intervention, we may have underestimated the effect on CAU participants. However, regular GP visits are brief and only take about ten minutes,[25] with little time to discuss the topic of concern – let alone other health-related topics.[61] Moreover, CAU participants did not receive any additional support that was part of the intervention.

Implications for practice, policy, and research

The present study showed that receiving twelve months of integrated care has no clear beneficial effect on patient-reported outcomes. Based on these results, the implementation of integrated care services for older adults cannot be recommended. However, in a qualitative study of Embrace, older adults indicated that they felt safe and secure due to Embrace care and support.[6] These results could contribute to decision-making and show the need for mixed method evaluations.[62] An effect study using goal attainment scaling could provide insight into the quality of care delivered by Embrace. In addition, it could offer an explanation for the absence of clear effects in the present study.[62]

Furthermore, future research should focus on the long-term effects of Embrace. A future cost-effectiveness study could help policy makers and professionals decide whether to implement Embrace. Finally, the effects of Embrace should also be evaluated in other geographical areas and in other cultures with different healthcare systems.

Conclusion

The present study showed that receiving twelve months of care and support from Embrace, a person-centered and integrated care service for community-living older adults, has no clear beneficial effect on patient-reported health, wellbeing and self-management outcomes. Future research should provide insight into the long-term effects of Embrace. As this is the first CCM-based RCT to include a population-based sample of community-living older adults, it contributes to the design of future research on population-based integrated care.

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TABLE S1 • Patient-reported outcomes at 12-month follow-up in the Embrace study: detailed results of the intention-to-treat multilevel analyses using data from the whole sample (n=1456)

			CAU (n=709)		Embrace (n=747)		Difference in change between CAU and Embrace (n=1456)				
	Scale scores (range)	Higher score*	T0 Mean (SD)	Δ Mean (SD)	T0 Mean (SD)	Δ Mean (SD)	t	B	95% CI	p†	ES
Health											
EQ-5D-3L	-0.33-1.00	+	0.78 (0.16)	0.00 (0.11)	0.79 (0.15)	0.00 (0.11)	-0.43	0.00	-0.01 to 0.01	0.670	0.02
EQ-VAS	0-100	+	69.7 (18.4)	-0.6 (12.4)	70.7 (17.6)	-0.5 (13.2)	0.15	0.10	-1.21 to 1.42	0.878	0.01
INTERMED-E-SA	0-60	-	11.4 (6.9)	-0.2 (4.1)	11.2 (6.4)	-0.1 (4.3)	0.53	0.12	-0.31 to 0.54	0.597	0.03
GFI	0-15	-	4.0 (2.9)	0.1 (1.7)	3.9 (2.8)	0.1 (1.7)	0.00	0.00	-0.18 to 0.18	0.998	0.00
Katz-15	0-15	-	1.94 (2.66)	0.19 (1.47)	1.77 (2.40)	0.35 (1.51)	1.98	0.15	0.00 to 0.31	**0.047**	0.10
PADL	0-6	-	0.49 (1.00)	0.06 (0.65)	0.42 (0.82)	0.14 (0.68)	2.53	0.09	0.02 to 0.16	**0.011**	0.13
IADL	0-7	-	1.24 (1.62)	0.13 (0.94)	1.16 (1.57)	0.19 (0.95)	1.33	0.07	-0.03 to 0.16	0.185	0.07
Wellbeing											
GWI SF Score	0-1	+	0.86 (0.18)	-0.02 (0.16)	0.86 (0.19)	-0.02 (0.16)	0.14	0.00	-0.02 to 0.02	0.892	0.01
QoL general	0-5	-	2.78 (0.93)	0.10 (0.73)	2.77 (0.92)	0.08 (0.74)	-0.47	-0.02	-0.09 to 0.06	0.636	0.02
QoL vs 1 year ago	0-5	-	3.13 (0.61)	0.04 (0.68)	3.08 (0.67)	0.08 (0.75)	0.99	0.04	-0.04 to 0.11	0.320	0.05
Self-management											
SMAS-30	0-100	+	56.5 (13.6)	-0.8 (8.2)	56.7 (13.3)	-1.1 (7.7)	-0.82	-0.34	-1.16 to 0.48	0.411	0.04
INIT	0-100	+	55.2 (17.1)	-2.5 (11.8)	55.2 (17.3)	-2.3 (12.1)	0.37	0.23	-0.99 to 1.46	0.709	0.02
SE	0-100	+	60.0 (18.0)	-0.9 (12.4)	60.1 (17.3)	-0.8 (12.1)	-0.75	-0.43	-1.55 to 0.69	0.455	0.04
INVEST	0-100	+	38.7 (19.6)	0.0 (13.7)	39.7 (20.1)	-1.1 (13.6)	0.25	0.16	-1.10 to 1.42	0.802	0.01
POSITIV	0-100	+	61.6 (16.3)	0.2 (12.4)	61.5 (15.9)	-0.2 (11.7)	-0.61	-0.38	-1.62 to 0.85	0.542	0.03
MULT	0-100	+	74.5 (14.4)	-0.4 (11.0)	74.2 (13.2)	-0.8 (10.9)	-1.54	-1.10	-2.50 to 0.30	0.124	0.08
VAR	0-100	+	49.0 (17.2)	-0.8 (14.4)	49.5 (17.0)	-1.3 (13.5)	-0.74	-0.54	-1.98 to 0.90	0.461	0.04
PIH-OA scale	8-64	+	47.1 (9.6)	0.4 (7.9)	47.1 (9.4)	0.8 (8.2)	1.07	0.45	-0.37 to 1.28	0.285	0.06
Knowledge	2-16	+	10.2 (3.7)	0.3 (3.6)	10.1 (3.8)	0.8 (3.4)	2.61	0.48	0.12 to 0.85	**0.009**	0.14
Management	2-16	+	12.4 (3.5)	0.0 (3.4)	12.5 (3.4)	0.1 (3.6)	0.40	0.07	-0.28 to 0.43	0.691	0.02
Coping	4-32	+	24.4 (5.5)	0.1 (4.4)	24.5 (5.5)	0.0 (4.4)	-0.44	-0.10	-0.55 to 0.35	0.659	0.02

CAU = Care as usual; EQ-5D-3L = EuroQol-5D-3L; EQ-VAS = EuroQoL-5D visual analogue scale; ES = Effect size d, thresholds <0.2 trivial, ≥ 0.2- 0.5 small, ≥0.5-0.8 medium, ≥ 0.8 large; GFI = Groningen Frailty Indicator; GWI SF Score = Groningen Well-being Indicator Satisfaction Score; IADL = Instrumental Activities of Daily Living; INIT = Taking initiatives subscale; INTERMED-E-SA = INTERMED for the Elderly Self-Assessment; INVEST = Investment behaviour subscale; Katz-15 = Modified Katz ADL index; MULT = Multi-functionality of resources subscale; PADL = Physical Activities of Daily Living; PIH-OA = Partners in Health scale for older adults; POSITIVE = Positive frame of mind subscale; QOL = Quality of life; SE = Self-efficacy beliefs subscale; SMAS-30 = Self-Management Ability Scale version 2; VAR = Variety in resources subscale.
* + Higher score means improvement; - higher score means deterioration; † Values are corrected for age and sex; bold values indicate p<0.05.

TABLE S2 • Patient-reported outcomes at 12-month follow-up in the Embrace study: detailed results of the intention-to-treat multilevel analyses using data from participants with the risk profile Complex care needs (n=365)

			CAU (n=178)		Embrace (n=187)		Difference in Δ between CAU and Embrace (n=365)				
	Scale scores (range)	Higher score*	T0 Mean (SD)	Δ Mean (SD)	T0 Mean (SD)	Δ Mean (SD)	t	B	95% CI	p†	ES
Health											
EQ-5D-3L	-0.33-1.00	+	0.64 (0.17)	-0.01 (0.13)	0.65 (0.16)	-0.02 (0.14)	-0.64	-0.01	-0.04 to 0.02	0.521	0.07
EQ-VAS	0-100	+	53.8 (19.4)	1.6 (16.5)	56.8 (16.8)	-0.1 (13.6)	-0.99	-1.54	-4.60 to 1.52	0.323	0.10
INTERMED-E-SA	0-60	-	20.6 (5.2)	-2.6 (5.0)	19.6 (4.6)	-1.9 (4.9)	1.44	0.75	-0.27 to 1.76	0.149	0.15
GFI	0-15	-	7.1 (2.4)	0.0 (1.8)	6.8 (2.4)	0.1 (1.8)	0.59	0.11	-0.26 to 0.48	0.552	0.06
Katz-15	0-15	-	4.17 (3.12)	0.33 (1.57)	3.89 (2.84)	0.58 (2.06)	1.27	0.24	-0.13 to 0.62	0.204	0.13
PADL	0-6	-	1.13 (1.33)	0.14 (0.78)	0.91 (1.16)	0.32 (0.98)	1.90	0.17	-0.01 to 0.36	0.058	0.20
IADL	0-7	-	2.58 (1.83)	0.16 (0.98)	2.55 (1.72)	0.27 (1.24)	0.91	0.11	-0.12 to 0.34	0.363	0.10
Wellbeing											
GWI SF Score	0-1	+	0.71 (0.22)	-0.03 (0.21)	0.70 (0.22)	-0.02 (0.19)	0.66	0.01	-0.03 to 0.05	0.512	0.07
QoL general	0-5	-	3.47 (0.79)	0.14 (0.66)	3.43 (0.80)	0.17 (0.65)	0.54	0.04	-0.10 to 0.17	0.587	0.06
QoL vs 1 year ago	0-5	-	3.51 (0.71)	0.01 (0.69)	3.45 (0.81)	-0.04 (0.91)	-0.72	-0.06	-0.23 to 0.10	0.471	0.08
Self-management											
SMAS-30	0-100	+	47.0 (14.0)	0.2 (9.1)	47.7 (14.8)	-2.0 (8.2)	-2.43	-2.17	-3.93 to -0.42	**0.015**	0.26
INIT	0-100	+	45.0 (18.7)	-2.1 (11.6)	46.5 (19.9)	-2.8 (12.0)	-0.63	-0.77	-3.19 to 1.64	0.530	0.07
SE	0-100	+	48.2 (18.9)	1.7 (12.4)	51.2 (19.1)	-2.1 (13.4)	-2.33	-2.97	-5.47 to -0.47	**0.020**	0.24
INVEST	0-100	+	28.8 (18.4)	0.8 (14.8)	29.6 (20.3)	-1.3 (12.6)	-2.82	-3.80	-6.44 to -1.15	**0.005**	0.30
POSITIV	0-100	+	51.7 (15.5)	1.2 (13.5)	49.9 (17.6)	-0.2 (12.0)	-1.23	-1.62	-4.19 to 0.95	0.217	0.13
MULT	0-100	+	66.4 (17.1)	1.1 (12.2)	67.7 (15.7)	-1.9 (12.3)	-1.53	-2.17	-4.94 to 0.61	0.126	0.16
VAR	0-100	+	41.6 (17.3)	-1.3 (14.0)	41.6 (18.2)	-3.2 (12.9)	-1.35	-1.89	-4.62 to 0.85	0.177	0.14
PIH-OA	8-64	+	41.7 (9.8)	1.1 (8.0)	42.8 (9.2)	1.1 (8.2)	0.03	0.03	-1.63 to 1.68	0.976	0.00
Knowledge	2-16	+	9.8 (3.7)	0.3 (3.4)	9.9 (3.4)	0.8 (3.0)	1.59	0.53	-0.12 to 1.18	0.113	0.17
Management	2-16	+	11.9 (3.6)	0.2 (2.7)	12.1 (3.5)	0.2 (3.7)	-0.04	-0.01	-0.68 to 0.65	0.969	0.00
Coping	4-32	+	20.0 (5.7)	0.6 (5.0)	20.8 (5.6)	0.1 (4.7)	-0.96	-0.49	-1.48 to 0.51	0.336	0.10

CAU = Care as usual; EQ-5D-3L = EuroQol-5D-3L; EQ-VAS = EuroQoL-5D visual analogue scale; ES = Effect size d, thresholds <0.2 trivial, ≥ 0.2- 0.5 small, ≥0.5-0.8 medium, ≥ 0.8 large; GFI = Groningen Frailty Indicator; GWI SF Score = Groningen Well-being Indicator Satisfaction Score; IADL = Instrumental Activities of Daily Living; INIT = Taking initiatives subscale; INTERMED-E-SA = INTERMED for the Elderly Self-Assessment; INVEST = Investment behaviour subscale; Katz-15 = Modified Katz ADL index; MULT = Multi-functionality of resources subscale; PADL = Physical Activities of Daily Living; PIH-OA = Partners in Health scale for older adults; POSITIVE = Positive frame of mind subscale; QOL = Quality of life; SE = Self-efficacy beliefs subscale; SMAS-30 = Self-Management Ability Scale version 2; VAR = Variety in resources subscale.
* + Higher score means improvement; - higher score means deterioration; † Values are corrected for age and sex; bold values indicate p<0.05.

TABLE S3 • Patient-reported outcomes at 12-month follow-up in the Embrace study: detailed results of the intention-to-treat multilevel analyses using data from participants with the risk profile Frail (n=237)

			CAU (n=115)		Embrace (n=122)		Difference in Δ between CAU and Embrace (n=237)				
	Scale scores (range)	Higher score*	T0 Mean (SD)	Δ Mean (SD)	T0 Mean (SD)	Δ Mean (SD)	t	B	95% CI	p†	ES
Health											
EQ-5D-3L	-0.33-1.00	+	0.74 (0.13)	0.0 (0.11)	0.74 (0.11)	-0.02 (0.10)	-1.22	-0.02	-0.04 to 0.01	0.223	0.16
EQ-VAS	0-100	+	70.0 (13.7)	-3.0 (11.4)	67.2 (15.7)	-1.7 (14.3)	0.86	1.45	-1.84 to 4.74	0.387	0.11
INTERMED-E-SA	0-60	-	10.9 (3.3)	1.3 (3.6)	11.5 (3.2)	1.4 (4.2)	0.51	0.25	-0.70 to 1.20	0.608	0.06
GFI	0-15	-	6.2 (1.4)	-0.7 (2.1)	6.2 (1.2)	-0.6 (2.1)	0.54	0.15	-0.38 to 0.67	0.586	0.07
Katz-15	0-15	-	2.41 (2.73)	0.39 (1.52)	2.40 (2.36)	0.28 (1.59)	-0.44	-0.09	-0.48 to 0.31	0.660	0.06
PADL	0-6	-	0.59 (1.17)	0.10 (0.58)	0.49 (0.81)	0.14 (0.66)	0.58	0.05	-0.11 to 0.20	0.561	0.08
IADL	0-7	-	1.57 (1.63)	0.25 (1.17)	1.66 (1.56)	0.11 (1.02)	-0.93	-0.13	-0.41 to 0.15	0.355	0.12
Wellbeing											
GWI SF Score	0-1	+	0.84 (0.16)	-0.02 (0.18)	0.83 (0.17)	-0.04 (0.18)	-0.71	-0.02	-0.06 to 0.03	0.478	0.09
QoL general	0-5	-	2.97 (0.79)	0.09 (0.72)	2.99 (0.71)	0.12 (0.74)	0.23	0.02	-0.16 to 0.21	0.818	0.03
QoL vs 1 year ago	0-5	-	3.03 (0.59)	0.17 (0.76)	3.02 (0.63)	0.11 (0.80)	-0.80	-0.08	-0.28 to 0.12	0.425	0.10
Self-management											
SMAS-30	0-100	+	54.8 (11.5)	-0.7 (8.4)	53.6 (9.1)	-0.4 (7.5)	0.38	0.39	-1.64 to 2.42	0.705	0.05
INIT	0-100	+	54.1 (16.0)	-2.3 (10.9)	51.8 (13.5)	-1.7 (13.3)	0.44	0.70	-2.41 to 3.81	0.658	0.06
SE	0-100	+	58.6 (15.7)	-1.3 (12.4)	56.2 (12.6)	0.0 (11.2)	0.50	0.63	-1.86 to 3.12	0.619	0.07
INVEST	0-100	+	36.8 (18.8)	0.5 (12.4)	37.1 (17.2)	-0.3 (13.3)	0.82	1.26	-1.74 to 4.26	0.412	0.11
POSITIV	0-100	+	58.0 (15.8)	0.5 (13.2)	58.2 (12.5)	-0.3 (11.4)	-0.41	-0.66	-3.79 to 2.47	0.680	0.05
MULT	0-100	+	74.8 (11.6)	-1.7 (10.2)	72.2 (10.6)	-1.1 (9.3)	-0.51	-0.86	-4.14 to 2.43	0.609	0.07
VAR	0-100	+	46.6 (16.2)	0.3 (14.3)	46.4 (14.5)	1.2 (12.9)	0.75	1.32	-2.11 to 4.76	0.450	0.10
PIH-OA	8-64	+	48.0 (8.7)	-0.8 (7.7)	44.7 (9.3)	1.7 (9.1)	2.33	2.54	0.40 to 4.69	**0.020**	0.31
Knowledge	2-16	+	10.4 (3.8)	-0.2 (3.8)	10.1 (3.7)	1.0 (3.7)	2.44	1.19	0.23 to 2.14	**0.015**	0.32
Management	2-16	+	13.0 (3.3)	-0.2 (2.9)	12.0 (3.3)	0.2 (3.5)	0.85	0.35	-0.46 to 1.16	0.398	0.11
Coping	4-32	+	24.6 (4.6)	-0.4 (4.5)	22.7 (5.2)	0.6 (5.2)	1.56	0.99	-0.26 to 2.24	0.119	0.21

CAU = Care as usual; EQ-5D-3L = EuroQol-5D-3L; EQ-VAS = EuroQoL-5D visual analogue scale; ES = Effect size d, thresholds <0.2 trivial, ≥ 0.2- 0.5 small, ≥0.5-0.8 medium, ≥ 0.8 large; GFI = Groningen Frailty Indicator; GWI SF Score = Groningen Well-being Indicator Satisfaction Score; IADL = Instrumental Activities of Daily Living; INIT = Taking initiatives subscale; INTERMED-E-SA = INTERMED for the Elderly Self-Assessment; INVEST = Investment behaviour subscale; Katz-15 = Modified Katz ADL index; MULT = Multi-functionality of resources subscale; PADL = Physical Activities of Daily Living; PIH-OA = Partners in Health scale for older adults; POSITIVE = Positive frame of mind subscale; QOL = Quality of life; SE = Self-efficacy beliefs subscale; SMAS-30 = Self-Management Ability Scale version 2; VAR = Variety in resources subscale.
* + Higher score means improvement; - higher score means deterioration; † Values are corrected for age and sex; bold values indicate p<0.05.

TABLE S4 • Patient-reported outcomes at 12-month follow-up in the Embrace study: detailed results of the intention-to-treat multilevel analyses using data from participants with the risk profile Robust (n=854)

			CAU (n=416)		Embrace (n=438)		Difference in Δ between CAU and Embrace (n=854)				
	Scale scores (range)	Higher score*	T0 Mean (SD)	Δ Mean (SD)	T0 Mean (SD)	Δ Mean (SD)	t	B	95% CI	p†	ES
Health											
EQ-5D-3L	-0.33-1.00	+	0.86 (0.10)	0.01 (0.10)	0.86 (0.10)	0.01 (0.10)	0.48	0.00	-0.01 to 0.02	0.630	0.03
EQ-VAS	0-100	+	76.5 (14.6)	-0.9 (10.3)	77.7 (14.3)	-0.4 (12. 8)	0.66	0.52	-1.03 to 2.07	0.511	0.05
INTERMED-E-SA	0-60	-	7.6 (3.9)	0.5 (3.4)	7.5 (3.7)	0.3 (3. 7)	-0.61	-0.15	-0.63 to 0.33	0.540	0.04
GFI	0-15	-	2.0 (1.3)	0.5 (1.5)	2.0 (1.3)	0.4 (1.5)	-0.82	-0.08	-0.28 to 0.11	0.411	0.06
Katz-15	0-15	-	0.86 (1.58)	0.08 (1.41)	0.69 (1.31)	0.26 (1.17)	2.11	0.19	0.01 to 0.36	**0.035**	0.14
PADL	0-6	-	0.18 (0.55)	0.01 (0.60)	0.19 (0.47)	0.07 (0.47)	1.70	0.06	-0.01 to 0.13	0.089	0.12
IADL	0-7	-	0.57 (1.03)	0.08 (0.85)	0.43 (0.91)	0.18 (0.78)	1.86	0.10	-0.01 to 0.21	0.063	0.13
Wellbeing											
GWI SF Score	0-1	+	0.93 (0.11)	-0.02 (0.13)	0.94 (0.12)	-0.02 (0.13)	0.13	0.00	-0.02 to 0.02	0.900	0.01
QoL general	0-5	-	2.44 (0.84)	0.08 (0.77)	2.43 (0.85)	0.03 (0.78)	-1.06	-0.06	-0.16 to 0.05	0.289	0.07
QoL vs 1 year ago	0-5	-	3.00 (0.50)	0.02 (0.65)	2.93 (0.55)	0.13 (0.64)	2.37	0.11	0.02 to 0.19	**0.018**	0.16
Self-management											
SMAS-30	0-100	+	61.0 (11.6)	-1.2 (7.8)	61.4 (11.3)	-0.9 (7.5)	0.43	0.23	-0.79 to 1.24	0.664	0.03
INIT	0-100	+	59.8 (14.6)	-2.8 (12.2)	59.8 (15.3)	-2.2 (11.8)	0.70	0.57	-1.03 to 2.18	0.485	0.05
SE	0-100	+	65.4 (15.6)	-2.0 (12.3)	65.0 (15.8)	-0.4 (11.8)	0.55	0.39	-1.02 to 1.80	0.585	0.04
INVEST	0-100	+	43.5 (18.7)	-0.4 (13.5)	44.8 (18.9)	-1.2 (14.1)	1.83	1.50	-0.11 to 3.11	0.068	0.13
POSITIV	0-100	+	66.9 (14.5)	-0.3 (11.6)	67.4 (12.7)	-0.1 (11.6)	0.21	0.16	-1.38 to 1.71	0.835	0.01
MULT	0-100	+	78.0 (12.3)	-0.6 (10.5)	77.6 (11.4)	-0.2 (10.7)	-0.87	-0.82	-2.67 to 1.02	0.383	0.06
VAR	0-100	+	52.8 (16.2)	-0.8 (14.6)	53.7 (15.7)	-1.2 (13.8)	-0.45	-0.44	-2.35 to 1.47	0.649	0.03
PIH-OA	8-64	+	49.1 (8.9)	0.4 (7.8)	49.6 (8.6)	0.4 (8.0)	0.08	0.04	-1.01 to 1.10	0.936	0.01
Knowledge	2-16	+	10.4 (3.7)	0.4 (3.7)	10.2 (4.0)	0.7 (3.5)	1.16	0.29	-0.20 to 0.77	0.245	0.08
Management	2-16	+	12.5 (3.6)	-0.1 (3. 7)	12.8 (3.4)	-0.1 (3.6)	0.04	0.01	-0.47 to 0.50	0.965	0.00
Coping	4-32	+	26.2 (4.5)	0.0 (4.0)	26.6 (4.4)	-0.2 (4.0)	-0.93	-0.25	-0.78 to 0.28	0.355	0.06

CAU = Care as usual; EQ-5D-3L = EuroQol-5D-3L; EQ-VAS = EuroQoL-5D visual analogue scale; ES = Effect size d, thresholds <0.2 trivial, ≥ 0.2- 0.5 small, ≥0.5-0.8 medium, ≥ 0.8 large; GFI = Groningen Frailty Indicator; GWI SF Score = Groningen Well-being Indicator Satisfaction Score; IADL = Instrumental Activities of Daily Living; INIT = Taking initiatives subscale; INTERMED-E-SA = INTERMED for the Elderly Self-Assessment; INVEST = Investment behaviour subscale; Katz-15 = Modified Katz ADL index; MULT = Multi-functionality of resources subscale; PADL = Physical Activities of Daily Living; PIH-OA = Partners in Health scale for older adults; POSITIVE = Positive frame of mind subscale; QOL = Quality of life; SE = Self-efficacy beliefs subscale; SMAS-30 = Self-Management Ability Scale version 2; VAR = Variety in resources subscale.
* + Higher score means improvement; - higher score means deterioration; † Values are corrected for age and sex; bold values indicate p<0.05.

TABLE 55 • Patient-reported outcomes at 12-month follow-up in the Embrace study: overview of the results of the complete case multilevel analyses for the whole sample and per risk profile

			Whole sample (n=1456)				Complex care needs (n=365)				Frail (n=237)				Robust (n=854)			
	Scale scores (range)	Higher score*	Mean Δ CAU	Mean Δ Embrace	p†	ES	Mean Δ CAU	Mean Δ Embrace	p†	ES	Mean Δ CAU	Mean Δ Embrace	p†	ES	Mean Δ CAU	Mean Δ Embrace	p†	ES
Health																		
EQ-5D-3L	-0.33-1.00	+	0.07	0.02	0.202	0.08	-0.01	-0.02	0.501	0.08	0.00	-0.02	0.192	0.20	0.11	0.04	0.282	0.08
EQ-VAS	0-100	+	-0.6	-0.4	0.922	0.01	2.0	-0.5	0.322	0.13	-2.9	-1.6	0.437	0.12	-0.9	-0.1	0.435	0.06
INTERMED-E-SA	0-60	-	-0.1	0.0	0.674	0.03	-2.6	-1.7	0.192	0.16	1.2	1.4	0.644	0.06	0.5	0.3	0.556	0.04
GFI	0-15	-	0.2	0.2	0.981	0.00	0.0	0.2	0.509	0.08	-0.7	-0.6	0.589	0.08	0.5	0.4	0.414	0.06
Katz-15	0-15	-	0.16	0.38	**0.021**	0.15	0.36	0.70	0.230	0.17	0.40	0.38	0.912	0.02	0.03	0.28	**0.015**	0.19
PADL	0-6	-	0.06	0.18	**0.009**	0.16	0.17	0.48	**0.020**	0.31	0.15	0.17	0.645	0.08	0.01	0.07	0.172	0.11
IADL	0-7	-	0.13	0.23	0.104	0.10	0.23	0.41	0.297	0.14	0.29	0.16	0.526	0.10	0.06	0.19	**0.044**	0.16
Wellbeing																		
GWI SF Score	0-1	+	-0.02	-0.02	0.883	0.01	-0.02	-0.02	0.759	0.04	-0.01	-0.04	0.349	0.15	-0.03	-0.02	0.508	0.05
QoL general	0-5	-	0.10	0.07	0.595	0.02	0.14	0.19	0.631	0.06	0.08	0.12	0.883	0.02	0.09	0.02	0.263	0.09
QoL vs 1 yr ago	0-5	-	0.04	0.09	0.318	0.06	0.03	-0.05	0.469	0.09	0.17	0.09	0.404	0.12	0.01	0.14	**0.018**	0.18
Self-management																		
SMAS-30	0-100	+	-0.8	-1.2	0.524	0.04	0.1	-2.6	**0.034**	0.28	-0.4	-0.3	0.830	0.03	-1.3	-0.9	0.545	0.05
INIT	0-100	+	-2.6	-2.2	0.615	0.03	-2.2	-3.1	0.607	0.07	-2.1	-1.5	0.661	0.07	-2.8	-2.0	0.422	0.06
SE	0-100	+	-0.4	-0.9	0.471	0.04	1.5	-2.4	**0.033**	0.27	-1.7	-1.0	0.685	0.06	-0.7	-0.3	0.619	0.04
INVEST	0-100	+	-1.0	-0.8	0.774	0.02	2.2	-3.0	**0.008**	0.34	-1.1	0.3	0.530	0.09	-2.1	-0.2	0.062	0.14
POSITIV	0-100	+	0.2	-0.3	0.573	0.03	1.6	-1.1	0.130	0.19	0.6	-0.4	0.729	0.05	-0.4	0.0	0.654	0.03
MULT	0-100	+	0.0	-1.3	0.136	0.09	0.9	-1.6	0.156	0.18	0.6	-0.4	0.627	0.07	-0.4	-1.5	0.350	0.07
VAR	0-100	+	-0.7	-1.4	0.483	0.04	-1.2	-3.8	0.181	0.17	0.3	1.6	0.408	0.12	-0.8	-1.3	0.661	0.03
PIH-OA	8-64	+	0.3	0.7	0.393	0.05	1.1	1.3	0.899	0.02	-1.1	1.8	0.051	0.31	0.3	0.3	0.966	0.00
Knowledge	2-16	+	0.2	0.8	**0.011**	0.15	0.1	0.9	0.107	0.21	-0.3	1.1	**0.018**	0.36	0.4	0.7	0.255	0.09
Management	2-16	+	0.0	0.0	0.830	0.01	0.3	0.2	0.893	0.02	-0.3	0.3	0.377	0.13	0.0	-0.1	0.866	0.01
Coping	4-32	+	0.1	0.0	0.607	0.03	0.6	0.1	0.499	0.09	-0.6	0.7	0.096	0.26	0.1	-0.3	0.203	0.10

CAU = Care as usual; EQ-5D-3L = EuroQol-5D-3L; EQ-VAS = EuroQoL-5D visual analogue scale; ES = Effect size d, thresholds <0.2 trivial, ≥ 0.2- 0.5 small, ≥0.5-0.8 medium, ≥ 0.8 large; GFI = Groningen Frailty Indicator; GWI SF Score = Groningen Well-being Indicator Satisfaction Score; IADL = Instrumental Activities of Daily Living; INIT = Taking initiatives subscale; INTERMED-E-SA = INTERMED for the Elderly Self-Assessment; INVEST = Investment behaviour subscale; Katz-15 = Modified Katz ADL index; MULT = Multi-functionality of resources subscale; PADL = Physical Activities of Daily Living; PIH-OA = Partners in Health scale for older adults; POSITIVE = Positive frame of mind subscale; QOL = Quality of life; SE = Self-efficacy beliefs subscale; SMAS-30 = Self-Management Ability Scale version 2; VAR = Variety in resources subscale.
* + Higher score means improvement; - higher score means deterioration; † Values are corrected for age and sex; bold values indicate p<0.05.

TABLE S6 • Patient-reported outcomes at 12-month follow-up in the Embrace study: detailed results of the complete case multilevel analyses using data from the whole sample (n=1456)

			CAU				Embrace				Difference in Δ between CAU and Embrace					
	Scale scores (range)	Higher score*	T0		Δ		T0		Δ							
			n	M (SD)	n	M (SD)	n	M (SD)	n	M (SD)	n	t	B	95% CI	p†	ES
Health																
EQ-5D-3L	-0.33-1.00	+	704	0.79 (0.16)	557	0.07 (0.78)	740	0.79 (0.15)	567	0.02 (0.50)	1124	-1.28	-0.05	-0.13 to 0.03	0.202	0.08
EQ-5D-VAS	0-100	+	697	69.8 (18.3)	551	-0.6 (13.7)	727	70.7 (17.5)	553	-0.4 (14.8)	1104	0.10	0.08	-1.60 to 1.76	0.922	0.01
INTERMED-E-SA	0-60	-	709	11.4 (6.9)	561	-0.1 (4.6)	747	11.2 (6.4)	569	0.0 (4.8)	1130	0.42	0.12	-0.43 to 0.67	0.674	0.03
GFI	0-15	-	709	4.0 (2.9)	561	0.2 (1.9)	747	3.9 (2.8)	569	0.2 (2.0)	1130	0.02	0.00	-0.22 to 0.23	0.981	0.00
Katz-15	0-15	-	660	1.82 (2.55)	504	0.16 (1.51)	696	1.67 (2.37)	501	0.38 (1.57)	1005	2.31	0.22	0.03 to 0.41	**0.021**	0.15
PADL	0-6	-	687	0.46 (0.96)	541	0.06 (0.71)	723	0.40 (0.80)	547	0.18 (0.74)	1088	2.60	0.11	0.03 to 0.20	**0.009**	0.16
IADL	0-7	-	673	1.21 (1.60)	530	0.13 (1.00)	709	1.11 (1.55)	525	0.23 (1.03)	1055	1.63	0.10	-0.02 to 0.22	0.104	0.10
Wellbeing																
GWI SF Score	0-1	+	626	0.86 (0.18)	488	-0.02 (0.18)	666	0.86 (0.19)	502	-0.02 (0.17)	990	0.15	0.00	-0.02 to 0.02	0.883	0.01
QoL general	0-5	-	708	2.78 (0.93)	557	0.10 (0.82)	744	2.77 (0.92)	569	0.07 (0.85)	1126	-0.53	-0.03	-0.12 to 0.07	0.595	0.02
QoL vs 1 year ago	0-5	-	708	3.13 (0.61)	560	0.04 (0.76)	744	3.08 (0.67)	569	0.09 (0.85)	1129	1.00	0.05	-0.05 to 0.14	0.318	0.06
Self-management																
SMAS-30	0-100	+	681	56.7 (13.5)	529	-0.8 (9.3)	714	56.8 (13.3)	539	-1.2 (8.7)	1068	-0.64	-0.35	-1.43 to 0.73	0.524	0.04
INIT	0-100	+	700	55.1 (17.1)	553	-2.6 (13.2)	740	55.2 (17.3)	565	-2.2 (13.7)	1118	0.50	0.41	-1.18 to 1.99	0.615	0.03
SE	0-100	+	704	74.7 (14.3)	558	-0.4 (12.3)	740	74.2 (13.1)	562	-0.9 (12.4)	1120	-0.72	-0.53	-1.97 to 0.91	0.471	0.04
INVEST	0-100	+	706	60.1 (17.9)	559	-1.0 (13.9)	742	60.1 (17.3)	565	-0.8 (13.7)	1124	0.29	0.24	-1.38 to 1.85	0.774	0.02
POSITIV	0-100	+	703	61.7 (16.3)	554	0.2 (13.9)	739	61.5 (15.7)	562	-0.3 (13.1)	1116	-0.56	-0.45	-2.03 to 1.13	0.573	0.03
MULT	0-100	+	704	38.8 (19.6)	554	0.0 (15.3)	734	39.7 (20.0)	559	-1.3 (15.2)	1113	-1.49	-1.36	-3.15 to 0.43	0.136	0.09
VAR	0-100	+	692	49.2 (17.1)	542	-0.7 (16.2)	723	49.7 (16.9)	550	-1.4 (15.2)	1092	-0.70	-0.67	-2.53 to 1.20	0.483	0.04
PIH-OA	8-64	+	667	47.2 (9.4)	512	0.3 (8.8)	711	47.2 (9.3)	524	0.7 (9.3)	1036	0.85	0.48	-0.62 to 1.58	0.393	0.05
Knowledge	2-16	+	696	10.3 (3.7)	541	0.2 (4.0)	729	10.1 (3.8)	552	0.8 (3.9)	1093	2.55	0.61	0.14 to 1.08	**0.011**	0.15
Management	2-16	+	692	12.5 (3.5)	546	0.0 (3.7)	729	12.5 (3.4)	547	0.0 (4.1)	1093	0.21	0.05	-0.41 to 0.51	0.830	0.01
Coping	4-32	+	683	24.4 (5.4)	534	0.1 (4.8)	732	24.5 (5.5)	550	0.0 (5.0)	1084	-0.51	-0.15	-0.74 to 0.43	0.607	0.03

CAU = Care as usual; EQ-5D-3L = EuroQol-5D-3L; EQ-VAS = EuroQoL-5D visual analogue scale; ES = Effect size d, thresholds <0.2 trivial, ≥ 0.2- 0.5 small, ≥0.5-0.8 medium, ≥ 0.8 large; GFI = Groningen Frailty Indicator; GWI SF Score = Groningen Well-being Indicator Satisfaction Score; IADL = Instrumental Activities of Daily Living; INIT = Taking initiatives subscale; INTERMED-E-SA = INTERMED for the Elderly Self-Assessment; INVEST = Investment behaviour subscale; Katz-15 = Modified Katz ADL index; MULT = Multi-functionality of resources subscale; PADL = Physical Activities of Daily Living; PIH-OA = Partners in Health scale for older adults; POSITIVE = Positive frame of mind subscale; QOL = Quality of life; SE = Self-efficacy beliefs subscale; SMAS-30 = Self-Management Ability Scale version 2; VAR = Variety in resources subscale.
* + Higher score means improvement; - higher score means deterioration; † Values are corrected for age and sex; bold values indicate p<0.05.

TABLE S7 • Patient-reported outcomes at 12-month follow-up in the Embrace study: detailed results of the complete case multilevel analyses using data from participants with the risk profile Complex care needs (n=365)

			CAU				Embrace				Difference in Δ between CAU and Embrace					
	Scale scores (range)	Higher score*	T0		Δ		T0		Δ							
			n	Mean (SD)	n	Mean (SD)	n	Mean (SD)	n	Mean (SD)	n	t	B	95% CI	p†	ES
Health																
EQ-5D-3L	-0.33-1.00	+	178	0.64 (0.17)	123	-0.01 (0.16)	186	0.65 (0.16)	129	-0.02 (0.17)	252	-0.67	-0.01	-0.05 to 0.03	0.501	0.08
EQ-5D-VAS	0-100	+	172	53.8 (19.4)	120	2.0 (19.9)	182	56.7 (16.7)	124	-0.5 (16.1)	244	-0.99	-2.26	-6.75 to 2.22	0.322	0.13
INTERMED-E-SA	0-60	-	178	20.6 (5.2)	123	-2.6 (6.0)	187	19.6 (4.6)	129	-1.7 (5.9)	252	1.31	0.97	-0.49 to 2.43	0.192	0.16
GFI	0-15	-	178	7.1 (2.4)	123	0.0 (2.2)	187	6.8 (2.4)	129	0.2 (2.2)	252	0.66	0.18	-0.36 to 0.72	0.509	0.08
Katz-15	0-15	-	159	4.04 (3.06)	103	0.36 (1.89)	161	3.87 (2.86)	97	0.70 (2.23)	200	1.20	0.35	-0.22 to 0.92	0.230	0.17
PADL	0-6	-	170	1.10 (1.32)	117	0.17 (0.93)	175	0.90 (1.15)	119	0.48 (1.11)	236	2.35	0.31	0.05 to 0.57	**0.020**	0.31
IADL	0-7	-	164	2.57 (1.83)	115	0.23 (1.17)	169	2.53 (1.72)	111	0.41 (1.45)	226	1.04	0.18	-0.16 to 0.52	0.297	0.14
Wellbeing																
GWI SF Score	0-1	+	161	0.70 (0.22)	109	-0.02 (0.26)	166	0.69 (0.21)	113	-0.02 (0.22)	222	0.31	0.01	-0.05 to 0.07	0.759	0.04
QoL general	0-5	-	178	3.47 (0.79)	122	0.14 (0.80)	187	3.43 (0.80)	129	0.19 (0.79)	251	0.48	0.05	-0.15 to 0.24	0.631	0.06
QoL vs 1 year ago	0-5	-	178	3.51 (0.71)	123	0.03 (0.83)	187	3.45 (0.81)	129	-0.05 (1.10)	252	-0.72	-0.09	-0.33 to 0.15	0.469	0.09
Self-management																
SMAS-30	0-100	+	170	47.4 (14.0)	114	0.1 (11.0)	177	47.8 (15.0)	122	-2.6 (9.9)	236	-2.13	-2.86	-5.50 to -0.22	**0.034**	0.28
INIT	0-100	+	177	44.9 (18.8)	122	-2.2 (13.8)	184	46.6 (20.0)	127	-3.1 (14.5)	249	-0.51	-0.92	-4.43 to 2.59	0.607	0.07
SE	0-100	+	176	66.5 (17.1)	122	1.5 (14.7)	184	67.7 (15.6)	125	-2.4 (14.6)	247	-2.15	-3.96	-7.59 to -0.33	**0.033**	0.27
INVEST	0-100	+	176	48.4 (18.9)	122	2.2 (14.7)	185	51.2 (19.1)	127	-3.0 (16.0)	249	-2.68	-5.21	-9.03 to -1.38	**0.008**	0.34
POSITIV	0-100	+	177	51.7 (15.6)	121	1.6 (16.3)	185	50.1 (17.3)	127	-1.1 (13.8)	248	-1.52	-2.83	-6.51 to 0.84	0.130	0.19
MULT	0-100	+	176	28.9 (18.4)	122	0.9 (17.9)	183	29.4 (20.2)	126	-1.6 (15.0)	248	-1.42	-2.92	-6.96 to 1.12	0.156	0.18
VAR	0-100	+	171	42.1 (17.2)	116	-1.2 (16.7)	180	41.7 (18.2)	125	-3.8 (15.5)	241	-1.34	-2.74	-6.78 to 1.29	0.181	0.17
PIH-OA	8-64	+	161	42.0 (9.5)	107	1.1 (9.5)	177	42.8 (9.2)	116	1.3 (9.8)	223	.128	0.16	-2.35 to 2.68	0.899	0.02
Knowledge	2-16	+	173	9.8 (3.7)	118	0.1 (4.0)	182	9.9 (3.3)	124	0.9 (3.4)	242	1.62	0.77	-0.17 to 1.72	0.107	0.21
Management	2-16	+	173	11.9 (3.5)	118	0.3 (3.2)	182	12.1 (3.5)	124	0.2 (4.4)	242	-0.13	-0.07	-1.05 to 0.92	0.893	0.02
Coping	4-32	+	167	20.0 (5.7)	113	0.6 (6.1)	182	20.7 (5.6)	121	0.1 (5.6)	234	-0.68	-0.51	-2.00 to 0.98	0.499	0.09

CAU = Care as usual; EQ-5D-3L = EuroQol-5D-3L; EQ-VAS = EuroQoL-5D visual analogue scale; ES = Effect size d, thresholds <0.2 trivial, ≥ 0.2- 0.5 small, ≥0.5-0.8 medium, ≥ 0.8 large; GFI = Groningen Frailty Indicator; GWI SF Score = Groningen Well-being Indicator Satisfaction Score; IADL = Instrumental Activities of Daily Living; INIT = Taking initiatives subscale; INTERMED-E-SA = INTERMED for the Elderly Self-Assessment; INVEST = Investment behaviour subscale; Katz-15 = Modified Katz ADL index; MULT = Multi-functionality of resources subscale; PADL = Physical Activities of Daily Living; PIH-OA = Partners in Health scale for older adults; POSITIVE = Positive frame of mind subscale; QOL = Quality of life; SE = Self-efficacy beliefs subscale; SMAS-30 = Self-Management Ability Scale version 2; VAR = Variety in resources subscale.
* + Higher score means improvement; - higher score means deterioration; † Values are corrected for age and sex; bold values indicate p<0.05.

TABLE S8. • Patient-reported outcomes at 12-month follow-up in the Embrace study: detailed results of the complete case multilevel analyses using data from participants with the risk profile Frail (n=237)

			CAU				Embrace				Difference in Δ between CAU and Embrace					
	Scale scores (range)	Higher score*	T0		Δ		T0		Δ							
			n	Mean (SD)	n	Mean (SD)	n	Mean (SD)	n	Mean (SD)	n	t	B	95% CI	p†	ES
Health																
EQ-5D-3L	-0.33-1.00	+	113	0.74 (0.13)	88	0.00 (0.12)	121	0.74 (0.11)	94	-0.02 (0.11)	182	-1.31	-0.02	-0.06 to 0.01	0.192	0.20
EQ-5D-VAS	0-100	+	113	70.0 (13.5)	88	-2.9 (12.4)	118	67.2 (15.6)	92	-1.6 (16.2)	180	0.78	1.68	-2.58 to 5.95	0.437	0.12
INTERMED-E-SA	0-60	-	115	10.9 (3.3)	90	1.2 (4.1)	122	11.5 (3.2)	95	1.4 (4.8)	185	0.46	0.29	-0.93 to 1.50	0.644	0.06
GFI	0-15	-	115	6.2 (1.4)	90	-0.7 (2.4)	122	6.2 (1.2)	95	-0.6 (2.4)	185	0.54	0.19	-0.49 to 0.87	0.589	0.08
Katz-15	0-15	-	109	2.24 (2.57)	80	0.40 (1.57)	112	2.36 (2.40)	82	0.38 (1.73)	162	0.11	0.03	-0.49 to 0.55	0.912	0.02
PADL	0-6	-	112	0.54 (1.07)	86	0.15 (0.58)	119	0.49 (0.80)	93	0.17 (0.72)	179	0.46	0.05	-0.15 to 0.24	0.645	0.08
IADL	0-7	-	110	1.53 (1.62)	84	0.29 (1.27)	114	1.61 (1.58)	85	0.16 (1.07)	169	-0.64	-0.12	-0.47 to 0.24	0.526	0.10
Wellbeing																
GWI SF Score	0-1	+	100	0.85 (0.14)	78	-0.01 (0.19)	108	0.83 (0.17)	82	-0.04 (0.21)	160	-0.94	-0.03	-0.09 to 0.03	0.349	0.15
QoL general	0-5	-	114	2.96 (0.79)	89	0.08 (0.81)	122	2.99 (0.71)	95	0.12 (0.84)	184	0.15	0.02	-0.22 to 0.26	0.883	0.02
QoL vs 1 year ago	0-5	-	114	3.03 (0.59)	89	0.17 (0.86)	122	3.02 (0.63)	95	0.09 (0.91)	184	-0.84	-0.11	-0.36 to 0.15	0.404	0.12
Self-management																
SMAS-30	0-100	+	110	55.1 (11.6)	85	-0.4 (9.6)	118	53.8 (8.9)	94	-0.3 (8.5)	179	0.22	0.29	-2.38 to 2.96	0.830	0.03
INIT	0-100	+	114	53.9 (16.0)	90	-2.1 (12.4)	121	51.7 (13.4)	95	-1.5 (15.3)	185	0.44	0.91	-3.17 to 4.98	0.661	0.07
SE	0-100	+	114	74.8 (11.6)	90	-1.7 (11.5)	121	72.1 (10.4)	95	-1.0 (10.5)	185	0.41	0.66	-2.54 to 3.87	0.685	0.06
INVEST	0-100	+	114	58.6 (15.7)	89	-1.1 (14.0)	121	56.1 (12.5)	95	0.3 (12.7)	184	0.63	1.24	-2.65 to 5.13	0.530	0.09
POSITIV	0-100	+	114	58.3 (15.5)	89	0.6 (14.9)	121	58.1 (12.4)	95	-0.4 (12.9)	184	-0.35	-0.72	-4.78 to 3.35	0.729	0.05
MULT	0-100	+	113	36.9 (18.9)	88	0.6 (13.9)	119	37.2 (17.0)	94	-0.4 (15.0)	182	-0.49	-1.05	-5.31 to 3.21	0.627	0.07
VAR	0-100	+	113	46.5 (16.2)	89	0.3 (16.2)	119	46.4 (14.5)	94	1.6 (14.6)	183	0.83	1.87	-2.59 to 6.33	0.408	0.12
PIH-OA	8-64	+	109	48.0 (8.3)	83	-1.1 (8.8)	115	44.8 (9.3)	83	1.8 (10.5)	166	1.96	2.95	-0.02 to 5.91	0.051	0.31
Knowledge	2-16	+	113	10.4 (3.8)	89	-0.3 (4.3)	119	10.1 (3.7)	92	1.1 (4.1)	181	2.39	1.50	0.26 to 2.73	**0.018**	0.36
Management	2-16	+	113	13.1 (3.1)	89	-0.3 (3.3)	117	12.0 (3.2)	90	0.3 (3.9)	179	0.89	0.46	-0.56 to 1.47	0.377	0.13
Coping	4-32	+	111	24.6 (4.5)	84	-0.6 (5.1)	120	22.7 (5.2)	90	0.7 (5.9)	174	1.67	1.41	-0.25 to 3.07	0.096	0.26

CAU = Care as usual; EQ-5D-3L = EuroQol-5D-3L; EQ-VAS = EuroQoL-5D visual analogue scale; ES = Effect size d, thresholds <0.2 trivial, ≥ 0.2- 0.5 small, ≥0.5-0.8 medium, ≥ 0.8 large; GFI = Groningen Frailty Indicator; GWI SF Score = Groningen Well-being Indicator Satisfaction Score; IADL = Instrumental Activities of Daily Living; INIT = Taking initiatives subscale; INTERMED-E-SA = INTERMED for the Elderly Self-Assessment; INVEST = Investment behaviour subscale; Katz-15 = Modified Katz ADL index; MULT = Multi-functionality of resources subscale; PADL = Physical Activities of Daily Living; PIH-OA = Partners in Health scale for older adults; POSITIVE = Positive frame of mind subscale; QOL = Quality of life; SE = Self-efficacy beliefs subscale; SMAS-30 = Self-Management Ability Scale version 2; VAR = Variety in resources subscale.
* + Higher score means improvement; - higher score means deterioration; † Values are corrected for age and sex; bold values indicate p<0.05.

TABLE S9 • Patient-reported outcomes at 12-month follow-up in the Embrace study: detailed results of the complete case multilevel analyses using data from participants with the risk profile Robust (n=854)

			CAU				Embrace				Difference in Δ between CAU and Embrace					
	Scale scores (range)	Higher score*	T0		Δ		T0		Δ							
			n	Mean (SD)	n	Mean (SD)	n	Mean (SD)	n	Mean (SD)	n	t	B	95% CI	p†	ES
Health																
EQ-5D-3L	-0.33-1.00	+	413	0.86 (0.10)	346	0.11 (0.98)	433	0.86 (0.10)	344	0.04 (0.63)	690	-1.08	-0.07	-0.19 to 0.06	0.282	0.08
EQ-5D-VAS	0-100	+	412	76.5 (14.5)	343	-0.9 (11.1)	427	77.7 (14.1)	337	-0.1 (13.9)	680	0.78	0.75	-1.13 to 2.62	0.435	0.06
INTERMED-E-SA	0-60	-	416	7.6 (3.9)	348	0.5 (3.7)	438	7.5 (3.7)	345	0.3 (4.22)	693	-0.59	-0.18	-0.77 to 0.41	0.556	0.04
GFI	0-15	-	416	2.0 (1.3)	348	0.5 (1.6)	438	2.0 (1.3)	345	0.4 (1.7)	693	-0.82	-0.10	-0.34 to 0.14	0.414	0.06
Katz-15	0-15	-	392	0.80 (1.51)	321	0.03 (1.34)	423	0.65 (1.27)	322	0.28 (1.24)	643	2.43	0.25	0.05 to 0.45	**0.015**	0.19
PADL	0-6	-	405	0.17 (0.53)	338	0.01 (0.65)	429	0.18 (0.46)	335	0.07 (0.52)	673	1.37	0.06	-0.03 to 0.15	0.172	0.11
IADL	0-7	-	399	0.56 (1.02)	331	0.06 (0.85)	426	0.42 (0.89)	329	0.19 (0.82)	660	2.01	0.13	0.00 to 0.26	**0.044**	0.16
Wellbeing																
GWI SF Score	0-1	+	365	0.94 (0.10)	301	-0.03 (0.13)	392	0.94 (0.12)	307	-0.02 (0.14)	608	0.66	0.01	-0.01 to0.03	0.508	0.05
QoL general	0-5	-	416	2.44 (0.84)	346	0.09 (0.84)	435	2.43 (0.84)	345	0.02 (0.87)	691	-1.12	-0.07	-0.20 to0.05	0.263	0.09
QoL vs 1 year ago	0-5	-	416	3.00 (0.50)	348	0.01 (0.71)	435	2.93 (0.55)	345	0.14 (0.72)	693	2.37	0.13	0.02 to0.24	**0.018**	0.18
Self-management																
SMAS-30	0-100	+	401	61.1 (11.6)	330	-1.3 (8.5)	419	61.5 (11.2)	323	-0.9 (8.3)	653	0.61	0.39	-0.88 to 1.67	0.545	0.05
INIT	0-100	+	409	59.9 (14.4)	341	-2.8 (13.2)	435	59.9 (15.2)	343	-2.0 (13.0)	684	0.80	0.80	-1.16 to 2.77	0.422	0.06
SE	0-100	+	414	78.1 (12.1)	346	-0.7 (11.5)	435	77.6 (11.4)	342	-0.3 (12.0)	688	0.50	0.44	-1.30 to 2.18	0.619	0.04
INVEST	0-100	+	416	65.4 (15.6)	348	-2.1 (13.4)	436	65.0 (15.8)	343	-0.2 (13.0)	691	1.87	1.87	-0.10 to 3.83	0.062	0.14
POSITIV	0-100	+	412	66.9 (14.5)	344	-0.4 (12.6)	433	67.4 (12.6)	340	0.0 (12.9)	684	0.45	0.43	-1.46 to 2.33	0.654	0.03
MULT	0-100	+	415	43.5 (18.7)	344	-0.4 (14.7)	432	44.8 (18.9)	339	-1.5 (15.4)	683	-0.94	-1.07	-3.32 to 1.18	0.350	0.07
VAR	0-100	+	408	52.9 (16.2)	337	-0.8 (16.1)	424	54.0 (15.5)	331	-1.3 (15.1)	668	-0.44	-0.53	-2.89 to 1.84	0.661	0.03
PIH-OA	8-64	+	397	49.1 (8.8)	322	0.3 (8.6)	419	49.7 (8.5)	325	0.3 (8.7)	647	-0.04	-0.03	-1.36 to 1.30	0.966	0.00
Knowledge	2-16	+	410	10.4 (3.7)	334	0.4 (4.0)	428	10.2 (4.0)	336	0.7 (4.0)	670	1.14	0.35	-0.25 to 0.95	0.255	0.09
Management	2-16	+	406	12.5 (3.5)	339	0.0 (4.0)	430	12.8 (3.4)	333	-0.1 (4.0)	672	-0.17	-0.05	-0.66 to 0.55	0.866	0.01
Coping	4-32	+	405	26.2 (4.4)	337	0.1 (4.3)	430	26.6 (4.4)	339	-0.3 (4.4)	676	-1.27	-0.42	-1.08 to 0.23	0.203	0.10

CAU = Care as usual; EQ-5D-3L = EuroQol-5D-3L; EQ-VAS = EuroQoL-5D visual analogue scale; ES = Effect size d, thresholds <0.2 trivial, ≥ 0.2- 0.5 small, ≥0.5-0.8 medium, ≥ 0.8 large; GFI = Groningen Frailty Indicator; GWI SF Score = Groningen Well-being Indicator Satisfaction Score; IADL = Instrumental Activities of Daily Living; INIT = Taking initiatives subscale; INTERMED-E-SA = INTERMED for the Elderly Self-Assessment; INVEST = Investment behaviour subscale; Katz-15 = Modified Katz ADL index; MULT = Multi-functionality of resources subscale; PADL = Physical Activities of Daily Living; PIH-OA = Partners in Health scale for older adults; POSITIVE = Positive frame of mind subscale; QOL = Quality of life; SE = Self-efficacy beliefs subscale; SMAS-30 = Self-Management Ability Scale version 2; VAR = Variety in resources subscale.
* + Higher score means improvement; - higher score means deterioration; † Values are corrected for age and sex; bold values indicate p<0.05.