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Original Study

Depressive Signs and Daily Life of Residents When Relocating from a Regular to an Innovative Nursing Home

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A B S T R A C T

Objectives: In this study, we examine how residents are affected by moving from a regular nursing home into an innovative living arrangement. In the past decade, a culture change has taken place, leading to rapid developments of innovative living arrangements that aim to change the physical, social, and organizational environment to better suit the needs of older adults needing 24-hour care. This has inevitably led to more group relocations in long-term care. Insight into the change in residents when relocating is lacking.
Design: An observational longitudinal study.
Setting and Participants: Four Dutch care organizations in which 5 relocations took place from a regular to an innovative living arrangement. Residents (N = 97) requiring 24-hour care who were relocated from a regular nursing home to an innovative living arrangement were included.
Methods: Data were collected 1 month before, 2 weeks after, and 6 months after relocating. Depressive signs and symptoms, cognitive functioning, and dependence in activities of daily living were measured using questionnaires. Furthermore, the daily lives of the residents were assessed using ecological momentary assessments.
Results: Overall, no long-term change in depressive signs and symptoms, cognitive functioning, and dependence in activities of daily living was found when relocating. Furthermore, the daily life of residents was not different 6 months after moving. Relocating was accompanied by a significant short-term increase in depressive signs and symptoms in 2 out of 4 locations ($P < .001$).
Conclusions and Implications: This study shows that relocating to an innovative living arrangement does not lead to long-term changes in residents. There are indications that there might be a short-term change in depressive signs and symptoms that could be prevented by considering the approach and context. More research is needed into the changes in the physical, social, and organizational environment that are necessary for a positive impact on the daily lives of residents.

In the past decade, a culture change has taken place, with a shift toward creating living environments that address the needs of residents and promote their autonomy. This culture change has led to innovative living arrangements in which drastic changes are made to the physical (eg, built environment, outdoor areas, and sensory elements), social (eg, interactions with others in the environment), and organizational (eg, how care and services are delivered) environment.[1-3] As residents living in nursing homes are dependent on others for their care, it is important to align their living environment with their needs in order to maximize their independence.[4-7] Furthermore, aspects of the physical environment, such as the number of residents,

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whether the nursing home has a homelike character, and access to outdoor spaces, can enhance the quality of life and the care of residents.[8,9] As a result, more innovative living arrangements are being developed, by rebuilding old nursing homes or building new facilities.

The increasing number of newly built innovative living arrangements inevitably leads to an increase in group relocations.[10] Previous studies suggest that relocations may have negative effects on both physical and mental health. Residents experience stress, uncertainty, loss of control, and negative health outcomes, including increased fall rates and depression.[11-14] However, despite the possible negative impact of relocating, changing the environment of a regular nursing home to an innovative living arrangement may lead to better health outcomes in the long run. Only a few studies have investigated the impact on residents who moved from a traditional nursing home environment into a small-scale, homelike arrangement. These studies suggest that, after the move, quality of life indicators improved,[15,16] there was less decline in cognition,[17] and there was more social engagement.[18,19] As innovative living arrangements are developing fast and relocations are becoming more common, it is important to gain more insight into the impact of relocating into an innovative living arrangement. Therefore, in this study we investigate the changes in depressive signs and symptoms, cognition, physical functioning, and daily life for residents who relocate from regular nursing homes to innovative living arrangements.

Methods

Design

A longitudinal observational study was conducted, including 3 measurements: a baseline measurement 4 weeks before relocating (M1), and 2 follow-up measurements taken, respectively, 2 weeks after (M2) and 6 months after relocating (M3). To ensure transparency and rigor, the STROBE checklist was used for reporting.[20]

Settings and Participants

Four long-term care locations that experienced a group relocation from a regular nursing home to an innovative living arrangement were included. See Table 1 for a detailed description of the locations (before and after). Regular nursing homes that were aiming to implement an innovative long-term care arrangement were selected. For a location to qualify as an innovative location, the study required there to have been an a priori deliberate intent to radically change the physical, social, and organizational environment by moving to the new location. All the locations provided 24-hour care for older adults with complex care needs. In total, 5 relocations took place, with 2 involving the same original location but taking place in separate phases. All residents who were relocating from the old to the new innovative location were eligible for participation. Residents relocating to another regular nursing home or who were terminally ill were excluded. No power analysis was performed due to the hypothesis-generating and explorative nature of our study.

Measures

Depressive signs and symptoms were assessed with the Cornell scale for depression in dementia (CSDD). This consists of 19 items that are scored on a 4-point scale with 5 domains: mood-related signs, behavioral disturbance, physical signs, cyclic functioning, and ideational disturbance.[21] Scores range from 0 to 38, with higher scores indicating more depressive symptoms. A score of 8 (or higher) is accepted as indicative of having depressive symptoms.[21]

Cognitive functioning was assessed with the standardized mini-mental state examination (S-MMSE) and the cognitive performance scale (CPS).[22,23] The S-MMSE consists of 19 items; scores range from 0 to 30, with higher scores indicating better cognitive functioning.[22] The CPS consists of 4 items; scores range from 0 to 6, with a higher score indicating lower cognitive functioning.[23]

Table 1
Description of Locations

Location	Description of Old Location	Description of New Location
Location 1	Residents lived on the second floor of a large building. The setting had a spacious corridor with rooms positioned side by side. The residents were placed together in smaller groups. Their possessions were packed before the move, and the relocation was portrayed as a holiday.	The goal was to establish an environment focusing on dementia-friendly living, guided by the principle of enhancing the quality of days rather than merely adding days to life. Staff members' goal was to look at the personal history of the residents and increasing quality of life by meeting the individual needs of the residents. Situated within the village, this larger building features a lively "living kitchen." Following the relocation, several staff members remained at the new site for approximately 1 week, including overnight stays, to assist the residents in acclimatizing to their new surroundings.
Locations 2a and 2b	A large nursing home with multiple wards, with a large pool of staff members, accommodating approximately 30 residents. Residents were notified by both staff and family members and stayed in a spacious hall on the day of the relocation.	Small residences each accommodating 7 residents, within a park-like setting. This setting has the objective of promoting freedom of movement for residents and delivering more person-centered care. Following the relocation, the staff tried to make the environment as familiar as possible to aid residents in adjusting. The way of working of staff members is comparable to the way of working of the Green house model, where they form a household with the residents. Furthermore, the houses are based on the same terrain as a larger-scale nursing home.
Location 3	A building resembling an apartment building, with 5 floors, 1 kitchen/living room, and accommodation for approximately 7 residents per floor. Before the move, residents had the opportunity to visit the new premises and select the wall color for their rooms.	A care setting that incorporates aspects of green care farms in the countryside, complete with outdoor walking paths and animals. Emphasis is placed on fostering residents' strengths and independence, and engaging collaboratively with them in activities. Following the relocation, staff members underwent several training courses on supporting residents with dementia to maintain as much independence and active engagement as possible.
Location 4	A large care facility with multiple smaller units. The location has a large pool of staff members. Residents reside in smaller groups within the ward. The original building was undergoing renovation while residents were still residing there. On the day of the relocation, they were accommodated in the nursing home's dining area.	A small-scale, 2-level, care facility in an urban location. It prioritizes fostering a homey atmosphere and actively involving family members in daily activities. Following the relocation, the staff made particular efforts to cultivate a calm and peaceful environment. Again there is some overlap with the way of working in the Green house model, as staff forms a household with the residents.

Activities of daily living (ADLs) were assessed with the ADL questionnaire (ADL-Hierarchy, part of the RAI-MDS) and the Barthel Index.[23,24] The ADL-Hierarchy (ADL-H) questionnaire has 4 items, which relate to mobility, eating, toilet use, and personal hygiene. Scores range from 0 to 6 with higher scores indicating more dependence for ADLs.[23] The Barthel Index consists of 10 questions; scores range from 0 to 20, with higher scores indicating more independence in ADLs.[24]

The *daily life* of the residents was observed using the Maastricht Electronic Daily Life Observation Tool (MEDLO).[25] This is an electronic observation tool, based on ecological momentary assessments (EMA).[26] Four domains of daily life are measured: daily activities, physical environment, social interaction, and emotional well-being. Residents were observed on 2 mornings (07:00–11:30), 2 afternoons (11:30–16:00), and 2 evenings (16:00–20:30). Every 20 minutes, between 8 and 14 residents were observed for approximately 1 minute in a random sequence. After every observation minute, the observer scored (1) the activity in which the resident was involved (either active or non-active), (2) the location of the resident at that moment, (3) the resident's engagement with the activity, (4) how physically active the resident was at that moment, (5) the amount of social interaction (eg, was there interaction? with whom? what type of interaction?), and (6) the resident's emotional well-being (eg, mood, agitation).

Procedure

Data collection took place from May 17, 2021, to November 18, 2022. During M1 (4 weeks before relocating), M2 (2 weeks after relocating), and M3 (6 months after relocating), residents were observed using the MEDLO over a period of 2 to 4 weeks, depending on the group size. Staff members who were most familiar with the residents filled in the CPS, ADL-H, Barthel Index, and CSDD. The first author or a trained research assistant conducted the observations and S-MMSE.

Analyses

Descriptive statistics were computed for all measurements; the mean and standard deviation of cognitive functioning, ADL dependence, and depressive signs and symptoms were recorded. Percentages of event occurrence ("yes" responses) were calculated for daily life events. The occurrence of an event indicated whether a resident participated in a certain activity, was present in a certain location, was involved, was socially active, was physically active, or experienced a certain mood or level of agitation. Preliminary analyses were conducted to assess the potential confounding effect of key variables on the Cornell Scale for depression in dementia, percentage of passive/purposeless behavior, and percentage of social interaction. The variables location, cognitive performance, and activities of daily living were considered to be controlling variables. After formal assessment, it was evident that there was a clear general effect-modification between time and location, therefore the results of all analyses were stratified by location.

A linear regression model was used to estimate changes in depressive signs and symptoms from M1 to M2 or M3, after controlling for the potential confounders of changes from baseline in cognitive functioning (CPS) and in activities of daily living (ADL-H). The model was run by stratifying location in order to account for the potential effect-modification of this variable. Adjusted results were derived in terms of point estimates and uncertainty measures for linear combinations of the model parameters to derive estimated changes in depressive signs and symptoms from M1 to M2 and M3, adjusted for all predictor variables in the model and separately reported by location. The statistical significance of the results was assessed using P values and corresponding 100 (1-α) % confidence intervals. Correction for multiple testing was applied using a Bonferroni approach for a total of 8 tests and an initial significance level of $\alpha = 0.05$, resulting in a corrected significance level of $\alpha^{\star} = 0.0063$.

In order to gain insights into the changes from the baseline in the percentage scores for "passive/purposeless behavior" and "social interaction" daily life events, secondary exploratory analyses were conducted. A linear regression model was used to estimate the change in, respectively, the percentage scores for "passive/purposeless behavior" or "social interaction" events from M1 to M2 or M3, after controlling for the same predictors as in the primary analysis. The results from the model were point estimates and uncertainty measures for linear combinations of the model parameters and were used to derive estimated changes in the percentage scores for "passive/purposeless behavior" or "social interaction" events from M1 to M2 or M3, adjusted for all predictor variables in the model and separately reported by location. The statistical significance of the results was assessed using P values and corresponding 100 (1-α) % confidence intervals. No correction for multiple testing was performed because of the exploratory nature of these secondary analyses. Therefore, a significance level of $\alpha = 0.05$ was considered significant. The software IBM SPSS Statistics (Version 27) was used for cleaning and preparing the data and R (version 4.2.2.) was used for performing all analyses.[27]

Ethics

The Medical Ethics Committee of Zuyderland confirmed that the regulations under the Medical Research involving Human Subjects Act do not apply to this study (registration number: METCZ20210065). All legal representatives of the residents received information concerning the study and provided written consent.

Results

Ninety-seven of the 125 eligible residents (participation rate: 77.6%) were included. See Figure 1 for the flowchart of the participant rate per measurement occurrence.

Sample Characteristics

No large differences were found at the baseline between the characteristics of the residents at the different locations, except for the scores of the CSDD (see Table 2). Residents of location 2b already seemed to be having more signs and symptoms of depression than residents at the other locations at baseline (see Table 2). Based on the results of exploratory analyses and input from experts, the location of the participants was identified as a variable of interest. Therefore, the decision was made to run all analyses per location instead of assuming a common relocation effect on participants across all locations.

Depressive Signs and Symptoms, Cognition, and ADLs

No differences in cognitive functioning or ADL dependence were observed over time. Immediately after the relocation, 52.9% of all residents had a CSDD score of 8 or higher. Before the relocation, and half a year after the relocation, the percentages were, respectively, 34.5% and 40.0%. The results of the primary analysis, looking at the individual locations, are presented in Table 3. None of the residents at any location seemed to experience a long-term change in their depressive symptoms from the relocation. However, the residents of locations 2a and 3 experienced significantly more depressive symptoms 2 weeks after the relocation when compared with the baseline measurement, indicating a short-term change [respectively CI (4.17, 10.56), $P < .001$ and CI (0.87, 6.73), $P < .001$]. No significant short-term difference was found for locations 2b and 4.

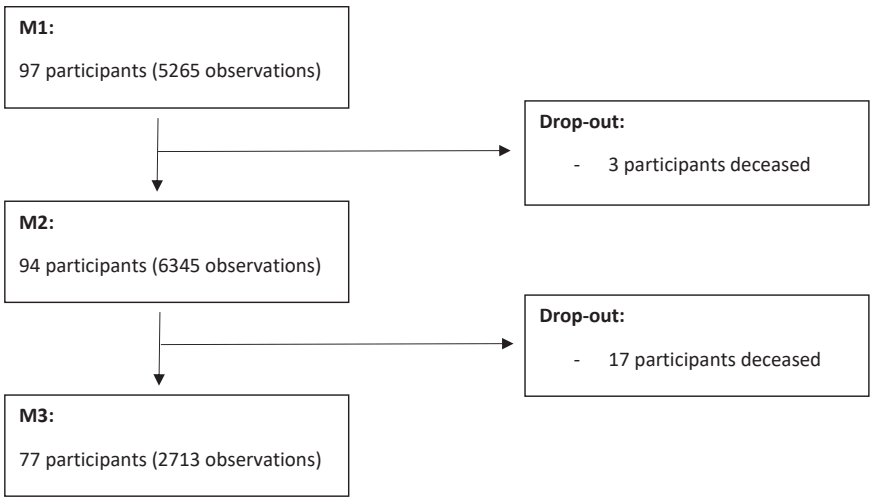

Fig. 1. Flowchart of participants throughout the study*. *As a result of COVID and the consequent lockdowns, not all MEDLO observation sessions could be continued. During follow-up 2, observations at 2 locations were canceled. Furthermore, at the other locations some observation sessions also had to be canceled for reasons related to lockdowns (mostly at the baseline), but all participants were still observed for a minimum of 3 day-sessions (1 morning, 1 afternoon, and 1 evening). When looking at 3 vs 6 observation days, no large differences in scores were found.

Daily Lives of Residents

Table 4 presents the descriptive statistics. Overall, the residents were mostly engaged in passive/purposeless activities in all measurements (M1 = 40.1%, M2 = 43.9%, M3 = 47.6%), while being actively engaged with the activity/environment (M1 = 86.5%, M2 = 88.2%, M3 = 84.2%) and engaging in little to no physical activity (M1 = 89.5%, M2 = 89.2%, M3 = 93.2%). The residents were engaged in social interaction around 20% of the time (M1 = 23.5%, M2 = 20.2%, M3 = 21.4%); this interaction was mostly with staff members and was of a positive nature. The residents showed mostly neutral signs of mood and no agitation across all 3 assessment moments. When looking descriptively at the location of the residents, it appears that there was a decline in the amount of time spent alone at locations 1 and 2b, but this trend was not visible at locations 2a, 3, or 4. All locations except location 4 seemed to show a small increase in the amount of time spent outside at M2.

Overall, the residents did not experience a significant change in passive/purposeless behavior over the whole of the relocation process, except at location 3 (see Table 3). Location 3 showed a significant increase in the amount of passive/purposeless behavior from the baseline to immediately after the relocation [CI (0.03, 0.15) $P = .006$] and 6 months after the relocation [CI (0.00, 0.16) $P = .041$]. The same trends are visible for social interaction, with residents at most locations experiencing no significant change in the amount of social interaction. However, at location 3 there was a significant decline in the amount of social interaction [CI (−0.14, −0.06) $P < .001$], whereas at location 4 there was a significant increase in the amount of social interaction [CI (0.01,0.12) $P = .014$] when comparing the baseline to immediately after the relocation.

Discussion

The results from this study indicate that relocating could lead to a short-term change in depressive signs and symptoms. Overall, no long-term change in depressive signs and symptoms was found. When looking at the influence of the changed environment, the study suggests that, in most of the locations studied, the intended positive influence was not, after 6 months, visible in the residents' daily lives. The residents of all but 1 location engaged in the same amount of passive/purposeless activities. In 1 location the amount of passive/purposeless activities even increased significantly over time. Furthermore, the residents engaged in similar amounts of social interaction before and after relocating. Only 1 location showed a temporary increase, 2 weeks after the relocation, in the amount of social interaction.

The increase in depressive signs and symptoms after relocating corroborates the findings of earlier studies on relocations that showed a short-term negative impact of relocations on the emotional outcomes of residents, which tends to normalize again over time.[13] Our results suggest that the context of the relocation process and the new location matters, as not every location showed the same trend in depressive symptoms. Most studies that look into the overall impact of relocations, however, include only 1 relocation, taking place in 1 nursing home.[28-33] Therefore, no comparison between cases can be made. Furthermore, the studies do not include an extensive description of the context of the environment and the relocation process, making it hard to determine which aspects might diminish the negative outcomes, or foster the positive ones. An example of the context, for example, is the preparation for the relocation. Poor preparation is associated with poor health outcomes.[11-14] It remains unclear, however, what preparatory aspects lead to more positive health outcomes.[12]

Despite the possibly negative impact of a relocation, long-term care organizations often aim to develop new locations with a better person environment fit and therefore to improve the circumstances of their residents. This makes relocating inevitable and necessary in order to optimize long-term care. Organizations often choose not to involve their residents in order to minimize the potential negative impact. However, feelings of not having control over impactful events are related to depressive symptoms and anxiety.[34] Therefore, actively involving residents in the relocation process is important. Furthermore, it can be argued that it is normal to respond to relocating, which is a very stressful procedure, by experiencing negative emotions. Research shows that stress and impactful life events are related to depressive episodes, even in individuals who do not suffer from dementia.[35] Therefore, next to actively involving residents and optimizing the relocation process, it is important to

Table 2
Residents' Sample Characteristics, Cognitive Functioning, ADL and Mood Scores

	Location 1 (N = 7)			Location 2a (N = 27)			Location 2b (N = 13)			Location 3 (N = 29)			Location 4 (N = 21)			Total (N = 97)		
	Base Line	Follow-Up 1	Follow-Up 2	Base Line	Follow-Up 1	Follow-Up 2	Base Line	Follow-Up 1	Follow-Up 2	Base Line	Follow-Up 1	Follow-Up 2	Base Line	Follow-Up 1	Follow-Up 2	Base Line	Follow-Up 1	Follow-Up 2
Age, mean (SD)	90.3 (5.3)			83.6 (9.3)			87.3 (4.4)			86.8 (7.1)			88.2 (7.4)			86.6 (7.6)		
Gender, % woman	42.9			66.7			46.2			75.9			76.2			67.0		
S-MMSE, mean (SD)	-*	-*	-*	11.6 (5.6)	10.9 (5.6)	10.0 (5.0)	11.0 (7.0)	10.9 (7.3)	10.4 (6.4)	10.9 (6.0)	10.2 (4.5)	8.8 (5.8)	8.1 (8.6)	9.8 (7.9)	12.0 (8.3)	10.4 (6.7)	10.3 (6.2)	10.2 (6.4)
CPS, mean (SD)	3.3 (2.2)	2.6 (2.4)	3.9 (2.3)	2.9 (1.4)	3.6 (1.4)	3.2 (1.1)	3.0 (1.7)	2.9 (1.2)	3.4 (1.3)	2.0 (1.4)	2.8 (1.2)	2.2 (1.1)	3.5 (1.5)	2.7 (2.1)	2.0 (2.3)	2.8 (1.6)	3.0 (1.6)	2.7 (1.8)
Barthel's index, mean (SD)	-*	-*	-*	10.2 (6.1)	10.4 (6.1)	9.3 (6.0)	10.7 (2.6)	9.7 (4.2)	9.7 (5.4)	11.3 (7.3)	10.6 (6.6)	11.8 (5.2)	9.1 (5.8)	9.2 (6.9)	8.0 (6.6)	10.4 (6.1)	10.1 (6.2)	9.7 (5.91)
ADL, mean (SD)	3.7 (1.1)	4.1 (0.9)	4.4 (1.1)	2.6 (1.6)	2.5 (1.7)	3.3 (1.6)	2.1 (0.8)	2.5 (1.4)	2.4 (1.6)	2.0 (2.1)	2.2 (1.9)	2.3 (1.3)	2.8 (1.7)	3.0 (1.8)	3.4 (1.7)	2.5 (1.7)	2.6 (1.7)	3.0 (1.6)
CSDD, mean (SD)	-*	-*	-*	4.9 (4.7)	12.5 (5.2)	7.5 (5.7)	11.9 (5.9)	12.3 (8.7)	7.0 (5.8)	5.1 (3.9)	9.4 (5.1)	4.4 (4.3)	7.6 (4.9)	4.4 (5.3)	7.7 (5.2)	6.6 (5.2)	9.5 (6.5)	6.6 (5.5)

*Due to time constraints experienced by location 1, 3 questionnaires could not be filled in.

Table 3
Estimates (and Standard Error, SE) of Depressive Symptoms, Passive/Purposeless Behavior, and Social Interaction Changes at All Locations With Associated Adjusted 100 (1-α)% Confidence Intervals, Shown in Terms of Lower (LB) and Upper (UB) Bound, and *P* Values

Time Difference	Location	Estimate	SE	LB	UB	*P* Value
Depressive signs and symptoms						
t0-t1	2a	7.37	1.14	4.17	10.56	<.001*
t0-t2	2a	2.42	1.16	−0.85	5.69	.04
t0-t1	2b	0.82	1.51	−3.41	5.05	.59
t0-t2	2b	−3.83	1.49	−8.05	0.40	.01
t0-t1	3	3.80	1.04	0.87	6.73	<.001*
t0-t2	3	−0.81	1.05	−3.78	2.16	.45
t0-t1	4	−2.04	1.21	−5.44	1.36	.10
t0-t2	4	0.73	1.15	−2.53	3.99	.53
Passive/purposeless behavior						
t0-t1	1	0.03	0.06	−0.09	0.14	.65
t0-t2	1	0.03	0.06	−0.10	0.16	.66
t0-t1	2a	−0.04	0.03	−0.11	0.03	.26
t0-t2	2a	-†	-†	-†	-†	-†
t0-t1	2b	0.07	0.05	−0.02	0.17	.14
t0-t2	2b	-†	-†	-†	-†	-†
t0-t1	3	0.09	0.03	0.03	0.15	.006‡
t0-t2	3	0.08	0.04	0.00	0.16	.041‡
t0-t1	4	0.04	0.04	−0.04	0.13	.29
t0-t2	4	0.04	0.05	−0.06	0.14	.40
Social interaction						
t0-t1	1	0.00	0.04	−0.08	0.07	.90
t0-t2	1	−0.07	0.04	−0.16	0.02	.12
t0-t1	2a	0.00	0.02	−0.05	0.04	.90
t0-t1	2a	-†	-†	-†	-†	-†
t0-t1	2b	0.01	0.03	−0.05	0.08	.65
t0-t2	2b	-†	-†	-†	-†	-†
t0-t1	3	−0.10	0.02	−0.14	−0.06	<.001‡
t0-t2	3	−0.03	0.03	−0.09	0.02	.20
t0-t1	4	0.07	0.03	0.01	0.12	.014‡
t0-t2	4	0.05	0.03	−0.02	0.12	.15

*A Bonferroni correction was applied resulting in an adjusted significance level $\alpha^{\star} = 0.00625$.

†Due to COVID and the consequences of lockdowns, not all MEDLO observation sessions could be continued. During follow-up 2, observations at locations 2a and 2b were canceled.

‡Significant at the $\alpha = 0.05$ level.

acknowledge and understand the emotions that are being experienced when relocating.

All the nursing homes in our study focused on changing the physical, social, and organizational environment with the intention of having a positive effect on the daily lives of their residents. Despite this intention, virtually no differences in activities, social interactions, or locations of the residents were found. This suggests that the intended culture change was not accomplished, at least not according to measures of daily functioning of the residents. A comparison of the scores of this study with previous studies using the MEDLO shows that they are more comparable to those for a regular nursing home, than for an innovative living arrangement.[36] It is known that culture change is difficult and that care organizations do not always succeed.[37,38] Besides the physical environment, the social and organizational environment have to change. The changing role of staff members is vital to accomplish this. Staff members need to have or to develop certain competencies, values, and norms.[1,2] Research shows that actively training staff members can lead to a more effective culture change.[39] However, research also shows that differences in active adoption of new roles can differ between sites, and even within sites.[40] This illustrates the challenges that staff face when relocating to an innovative living arrangement. Research shows that goal-directed behavior (eg, actively implementing a new culture) declines and habit-driven behavior increases, when stress is experienced.[41] As relocating is also a very stressful procedure for staff members,[42] they

Table 4
Daily Lives of Residents

Aspect of Daily Life	Category	Total			Location 1			Location 2a*			Location 2b*			Location 3			Location 4		
		% Base Line	% Follow-Up 1	% Follow-Up 2	% Base Line	% Follow-Up 1	% Follow-Up 2	% Base Line	% Follow-Up 1	% Follow-Up 2	% Base Line	% Follow-Up 1	% Follow-Up 2	% Base Line	% Follow-Up 1	% Follow-Up 2	% Base Line	% Follow-Up 1	% Follow-Up 2
Activity	Passive/ purposeless	40.1	43.9	47.6	49.8	52.6	52.0	38.3	34.9	-	41.2	47.2	-	36.6	45.5	44.1	44.6	49.0	51.5
	Recreational	12.3	10.8	13.0	16.4	9.1	16.3	9.3	12.1	-	7.5	14.8	-	15.6	8.5	11.8	11.8	10.0	13.2
	Social	11.0	10.1	9.4	8.1	10.5	8.1	10.9	10.4	-	13.4	9.4	-	11.7	10.3	9.1	9.4	9.7	11.0
	Eating/drinking	11.3	12.1	13.7	13.6	13.1	14.7	10.0	11.7	-	8.2	14.1	-	11.4	10.9	14.7	14.4	12.6	11.1
	Domestic	1.3	0.9	1.2	0.2	1.0	2.0	0.4	1.6	-	0.5	0.3	-	2.4	0.9	1.3	1.4	0.3	0.5
	Outdoor	1.6	1.9	1.0	0.5	0.0	0.4	0.6	0.6	-	1.6	1.6	-	2.3	3.7	1.3	2.1	2.6	0.9
	Care	5.3	3.2	3.8	7.1	6.7	5.8	5.1	4.4	-	5.0	4.9	-	6.1	1.3	3.6	3.6	1.5	3.0
	Other	0.2	0.9	0.3	0.0	0.4	0.0	0.5	2.8	-	0.0	0.2	-	0.2	0.1	0.1	0.0	0.1	0.8
	Not observable	5.1	5.2	2.9	3.1	6.5	0.6	6.4	5.9	-	2.7	2.1	-	7.7	7.1	4.4	0.7	3.5	1.6
	Alone in room	11.8	10.9	6.9	1.2	0.0	0.2	18.5	15.7	-	20.0	5.3	-	6.0	11.9	9.6	12.0	10.6	6.3
Engagement	Engaged in activity	86.5	88.2	84.2	76.6	86.2	77.6	88.4	86.3	-	79.1	83.7	-	87.8	91.6	86.5	89.9	90.7	84.8
Location	Private room	41.7	40.3	35.5	61.4	38.4	39.3	45.0	47.3	-	48.0	37.0	-	37.8	31.9	33.3	30.5	42.7	37.1
	Public space	55.8	55.9	61.9	38.6	48.4	59.7	51.8	46.7	-	51.9	61.7	-	59.9	65.1	62.1	65.1	57.2	62.8
	Outside	2.5	3.8	2.6	0.0	13.2	1.0	3.1	6.0	-	0.2	1.3	-	2.3	3.0	4.5	4.5	0.1	0.1
Level of social interaction	Social interaction	23.5	20.2	21.4	30.5	31.9	23.4	24.7	22.0	-	22.0	21.8	-	26.4	15.4	22.2	14.7	17.8	18.4
Social interaction with whom	Staff members	49.0	50.5	63.4	77.9	59.8	70.3	39.8	54.2	-	36.6	45.9	-	50.7	35.4	59.5	55.5	56.7	66.4
	Residents	28.6	30.7	16.8	1.0	22.0	9.0	33.8	22.2	-	49.6	35.9	-	27.5	49.2	18.2	21.0	28.9	20.5
	Family/others	22.4	18.8	19.8	21.2	18.1	20.7	26.4	23.6	-	13.8	18.2	-	21.8	15.3	22.3	23.5	14.4	13.1
Nature of social interaction	Positive	94.7	93.3	93.8	94.9	93.6	94.9	93.5	88.7	-	96.7	94.7	-	94.8	97.2	92.4	95.0	96.2	95.6
Physical activity	Physically active	10.5	10.8	6.8	7.3	12.5	3.9	13.7	11.3	-	14.7	9.7	-	8.8	11.0	8.5	8.6	10.2	5.7
Mood	Positive mood	79.5	80.9	74.3	61.7	72.3	55.2	80.8	72.5	-	78.6	79.3	-	79.5	89.1	81.9	86.0	87.7	74.5
Agitation	Agitation	2.4	2.7	3.1	12.2	5.7	7.0	2.4	4.3	-	0.6	1.9	-	1.5	1.5	1.9	0.9	1.3	2.6

*Due to COVID and the consequences of lockdowns, not all MEDLO observation sessions could be continued. During follow-up 2, observations at 2 locations were canceled. Furthermore, at the other locations some observation sessions had to be canceled for lockdown-related reasons as well (mostly at baseline), but all participants were still observed a minimum of 3 day-sessions (1 morning, 1 afternoon, 1 evening). When looking at 3 vs 6 observation days, no large differences in scores have been found.

might relapse into old and familiar behaviors and ways of working, making the achievement of a successful culture change challenging.[43]

As the focus of the current study was on group relocations from regular to innovative living arrangements at the time they were occurring, we were not able to measure a relevant control group. Therefore, our results are exploratory and are of a hypothesis-generating nature, and should be interpreted with caution. Furthermore, the baseline measurements took place quite close to the actual moves. As preparations often started early, the residents might already have noticed changes in staff and the environment, affecting the baseline measurements. Having multiple baseline measurements would have given better insights into the a priori functioning. However, as we wanted to study the change in outcome measures when relocating and wanted to avoid measuring the natural decline of residents, the choice was made not to follow the residents too early in time. Furthermore, as our study shows that the change in outcome measures when relocating differs for different locations, a more elaborate description of the context would have been helpful in interpreting the results.

Because of the exploratory nature of this study, we have chosen to perform analyses that are appropriate for this design, taking the lack of control group and smaller sample size into account. However, it is noteworthy that more elaborate analyses should be considered for future controlled studies. Furthermore, as the MEDLO tool is based on ecological momentary assessments, it would be interesting to further explore the possibilities of using the raw EMA data in the analyses instead of aggregating the data.

Future research should focus on performing a larger-scale study, including multiple relocations to innovative living arrangements, with regular long-term relocations as a control group. Furthermore, future research should provide more context for all the relocation processes and gain more insight into the underlying mechanisms that lead either to an increase in depressive symptoms or to no increase. This study shows that culture change has not, yet, been successfully implemented in the locations studied. More insight into the culture change process and how this develops over time should be gained.

Conclusions and Implications

The results from this study suggest that a relocation within long-term care can lead to a short-term change in depressive signs and symptoms in residents. Context may matter, as this change was not observed for all relocations. This study emphasizes the importance of taking into account the emotions of residents during the relocation process. Residents tend to experience more negative emotions in the period immediately after the relocation. A recent review, however, has indicated that previous interventions have focused mostly on the preparation phase before the actual relocation, with less attention being paid to the period after relocation.[44] Furthermore, although all locations intended to implement a culture change with the aim of having a positive impact on the daily lives of residents, this is not, yet, visible in the daily lives of residents.

This study shows it is important for involved stakeholders to not only focus on the period before relocating, but to also take the weeks after relocating into account, as this period seems to be particularly stressful for residents. Furthermore, this study shows that achieving a culture change might be a challenging process, emphasizing the need for more knowledge concerning successful implementation.

Disclosures

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