

Nonpharmacological interventions in patients with cognitive impairment: a comparison of residential and nursing homes in Poland

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KEY WORDS

cognitive impairment, cognitive therapy, interRAI-LTCF tool, nonpharmacological therapy, nursing home

ABSTRACT

INTRODUCTION Availability of nonpharmacological interventions to manage neuropsychiatric symptoms is important to reduce the use of psychotropic drugs in residents with dementia in long-term care facilities (LTCFs).

OBJECTIVES We aimed to assess prevalence of nonpharmacological interventions in residents with cognitive impairment in LTCFs, and to find factors associated with their participation in cognitive therapy (CT).

PATIENTS AND METHODS A cross-sectional analysis of a country-representative sample of 23 LTCFs in Poland was conducted between 2015 and 2016. We used the InterRAI-LTCF tool to collect data from 455 residents with cognitive impairment.

RESULTS Most of the residents were involved in occupational therapy activities (73.4%) and medical rehabilitation (67.2%); however, less than half participated in CT (44.8%) and physical activity group (41.2%), and only 24.2% of individuals received psychological therapy (PT) and only 22.7% of residents were encouraged to enhance their ability with activities of daily living (ADL). We found a positive correlation between participation in enhancing ADL and CT ($\rho = 0.677$; $P < 0.001$), and a considerable variation between the LTCFs in prevalence of PT, CT, and encouraging maintaining ADL. The chance of participating in CT was higher in women (odds ratio [OR], 1.87; 95% CI, 1.15–3.04), residents of nursing homes (OR, 2.79; 95% CI, 1.69–4.60), of larger facilities (OR, 4.09; 95% CI, 2.45–6.81), and among residents having moderate cognitive impairment (OR, 2.27; 95% CI, 1.27–4.08), delusion (OR, 2.31; 95% CI, 1.34–3.98), diagnosis of depression (OR, 5.07; 95% CI, 2.31–11.14), or Alzheimer disease accompanied by behavioral disorders (OR for interaction, 5.25; 95% CI, 1.28–21.58).

CONCLUSIONS We found a relatively high use of medical rehabilitation and occupational therapy and significant diversity between facilities in use of CT, PT, and maintaining/enhancing ADL.

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INTRODUCTION As a result of increasingly aging populations amongst many countries of the world, the number of people with cognitive impairment is growing significantly. At the same time, significant changes in the family structure means that family members' ability to provide continuous care for the chronically ill relatives at home is disrupted. Therefore, many people with cognitive impairment are eventually placed in long-term care facilities (LTCFs). In Europe, more than 60% of the population in LTCFs are people with cognitive impairment.^{1,2} A similarly high prevalence of cognitive impairment (65.2%) has

also been demonstrated in our study of a nationally represented sample in Poland with 59.2% of residents with cognitive impairment in residential homes (RHs) and 74.5% in nursing homes (NHs).³ This study also revealed a high prevalence of neuropsychiatric symptoms (NPS) among these residents. We found that the prevalence of aggressive behavior (49.5%), agitation (30.3%), and wandering (22.7%) did not differ significantly between the various settings, but NH residents were more likely to show resistance to care (up to 38.7%), hallucinations (up to 25.5%), and delusions (up to 28.9%) when compared with RH residents.⁴

WHAT'S NEW?

In this study, we assessed the use of nonpharmacological interventions in residents with cognitive impairment residing in long-term care facilities in Poland. We found relatively high accessibility of medical rehabilitation and occupational therapy in most facilities, but much lower cognitive therapy (CT), psychological therapy, and enhancing independence in activities of daily living. Cognitive therapy and psychological therapy were more often available in the facilities where residents participated in enhancing of activities of daily living. Cognitive therapy was more likely provided to residents living in larger facilities or nursing homes and to people with symptoms of depression, delusions, or Alzheimer disease accompanied by behavioral disorders. However, residents with mild or severe cognitive impairment had a lower chance to receive CT compared with persons with moderate cognitive impairment. Hence, the development of nonpharmacological interventions in long-term care facilities is needed to make them available to all residents with cognitive impairment, and for physicians to refer patients more frequently to CT.

Such symptoms are common among residents of LTCFs. As a result, residents experience discomfort and a significant burden is put on care staff. Residents therefore require specific pharmacological and nonpharmacological treatment. Psychotropic medications are frequently used to manage NPS despite strong evidence that the risk of adverse effects of these medications outweighs the benefits.^{5,6} Therefore, they should be used as a second-line treatment for a limited period of time and withdrawn whenever possible. Because there is some evidence showing efficacy of nonpharmacological therapies with a limited potential for adverse effects, they are recommended as the first-choice therapy and an alternative option for pharmacological treatment.^{7,8} A number of studies have highlighted the effectiveness of nonpharmacological therapies such as occupational therapy,^{9,10} exercise trainings,¹¹⁻¹³ music therapy,^{14,15} art therapy,^{16,17} or cognitive and behavioral interventions.^{18,19}

However, it is unknown how often Polish LTCFs residents with cognitive impairment receive nonpharmacological interventions (NPIs), and which particular therapies are available for them. Thus, the aim of this study was to explore the use of different NPIs, namely: medical rehabilitation (MR); restoring everyday life through maintaining/enhancing activities of daily living (enhancing ADL); physical group activity (PA); occupational therapy-type activities (OT); cognitive therapies (CT); and psychological therapy (PT) for residents with cognitive impairment. We also wanted to establish factors associated with the use of CT in a nationally representative sample of such residents in both NHs and RHs in Poland. We assumed the following research hypotheses: 1) The use of NPIs is more frequent among residents with cognitive impairment residing in NHs compared with RHs. 2) The specific facility characteristics such as NH type, larger size, and private ownership status are associated with higher use of certain NPIs. 3) Specific resident characteristics such as level of

cognitive impairment, presence of Alzheimer disease (AD) or other dementias are associated with higher chance for participating in CT.

PATIENTS AND METHODS Recruitment The study was performed in 23 LTCFs (both NHs and RHs) providing care for older or chronically ill adults from across Poland (see Supplementary material for context of LTCFs). Facilities were randomly selected from all 6 macro regions (according to the Nomenclature of Territorial Units for Statistics codes, NUTS level 1, as binding in 2014) in terms of size, status, geographical region, number of beds, and facility type. The study protocol, including a detailed sample calculation and inclusion criteria to the study³ as well as the comparison of organization of both types of the facilities⁴ have been described in detail elsewhere.

The sampling procedure met minimum requirements regarding the expected number of both facilities and residents. Out of 49 randomly selected facilities (which expressed initial consent), 26 refused to participate in the study. However, they provided basic organizational data, so we could perform nonresponse analysis which did not show statistically significant differences between LTCFs involved in the study and those which declined to participate.

The study sample involved 1587 residents from 11 NHs and 12 RHs; each resident had their level of cognitive impairment assessed using the Cognitive Performance Scale (CPS).²⁰ The CPS is a 5-item observational scale embedded in the InterRAI Long-Term Care Facilities Assessment System questionnaire (InterRAI-LTCF). It demonstrates a high level of agreement with the Mini-Mental State Examination²¹ and the Montreal Cognitive Assessment.²² We excluded 459 residents who did not have cognitive impairment (based on the CPS score with a cut-off of less than 2 points), and 93 residents who were in coma. We received a sample of 1035 residents with cognitive impairment. Finally, we randomly selected 20 residents from each of the 23 institutions ($n = 460$). The LTCF staff returned valid questionnaires from 455 residents with cognitive impairment: 214 recruited from NHs and 241 from RHs.

Measurements Data were collected from 2015 to 2016 using the interRAI-LTCF questionnaire²³ on the basis of a 3-day observation of residents by a nurse or psychologist who had undergone a standardized training. The interRAI-LTCF suit is a standardized tool and consists of over 350 questions comprising a comprehensive geriatric assessment designed to assist clinicians in evaluating the health and functional status of LTCF residents, and their care needs.²⁴ It includes an inventory of different somatic symptoms and neuropsychiatric signs comprising psychotic symptoms (hallucinations, delusions), behavioral problems (agitation, aggressive behavior, wandering, verbal and physical abuse, resistance to care, socially inappropriate behavior), and depressive

TABLE 1 The list of nonpharmacological therapies administered in long-term care facilities residents with cognitive impairment

Therapy	Questionnaire items referring to specific therapies	Description of specific therapies (as they are defined)
MR	Physiotherapy	MR is indicated in specific diseases, eg, after stroke, bone fracture, musculoskeletal disorders, and should concentrate on individuals at the center of care in their environment; and be tailored to their needs, strengths and limitations. It includes physiotherapy, physical therapy, and breathing exercises.
	Physical therapy (ie, hydrotherapy, ultrasound, laser therapy, sollux lamp)	
	Breathing exercises	
Maintaining and enhancing ADL	Restoring everyday life activities	Maintaining and enhancing ADL is aimed at restoring everyday life activities. It includes teaching patients with the aim to increase their performance of basic self-care tasks such as grooming, bathing, toileting, dressing, feeding, achieving functional mobility, and communicating independently in diverse environments.
PA group	Group activity including senior exercise and fitness	PA group programmes may bring multiple benefits including improved cognition, activities of daily life and independence, functional ability, and mental health. It includes senior exercise and fitness classes, walking, music and movement as well as outdoor activities such as gardening, nordic walking, etc.
OT-type activity	OT classes	OT is aimed to recover or maintain the daily living and cognitive function. It focuses on adapting the environment, modifying the task, teaching the skill, and educating the patient, with the aim to increase her or his participation in performance of daily activities. It includes also reading, listening to the radio, watching TV, and art therapy.
	Maintaining patient's interests by regular reading, listening to the radio, and watching TV	
	Art therapy as part of occupational therapy	
CT	Memory training by repeating exercises/tasks	CT is specifically addressed to dementia patients, since it has been shown to be effective in improving cognitive functioning and controlling NPS. It includes: memory training by repeating exercises/tasks ⁴⁸ ; orientation in reality and environment through repetition of information about surroundings, relatives, time, etc ^{42,49} ; evoking memories ⁴² ; stimulation of positive reactions with different stimuli (warmth, touch, light, smell, sound); validation therapy which involves talking to the patient and correcting the information he or she provides.
	Orientation in reality, environment through repetition of information about surroundings, relatives, etc	
	Evoking memories	
	Stimulation of positive reactions with different stimuli (warmth, touch, light, smell, sound)	
	Validation therapy	
PT	Therapy including talks involving the elements of emotional psychotherapy	PT may have various forms and can be used in diverse contexts to meet patient needs. In dementia care, PT focuses on talking about feelings, emotions, and ways of thinking; it occurs regularly within a specific context; draws on psychological formulations; promotes change within an individual or the environment around the person; aims to enhance well-being either by helping individuals to understand themselves and their illness, or by changing their patterns of thinking or behavior. ⁵⁰

Abbreviations: ADL, activities of daily living; CT, cognitive therapy; MR, medical rehabilitation; NPS, neuropsychiatric symptoms; OT, occupational therapy; PA, physical activity; PT, psychological therapy

signs. The questionnaire also includes a checklist of medical diagnoses of chronic somatic and psychiatric diseases (including depression, AD, and other dementias) retrieved from medical records. Moreover, it contains items regarding pressure ulcers, incontinence, falls, and nutrition.

We also used some scales from the interRAI-LTCF tool:

- A 7-point CPS scale to assess cognitive impairment (mild, 2 points; moderate, 3–4 points, or severe, 5–6 points);
- The Activities of Daily Living Hierarchy scale (ADLh) measuring functional performance assessing 4 activities: personal hygiene, locomotion, toilet use, eating on a 7-point scale of dependency (independent, 0–1 points; moderately dependent, 2–3 points; severely dependent, 4–6 points)²⁵;
- The Aggressive Behavior Scale (ABS): a 4-item scale to measure verbal and physical abuse, socially inappropriate behavior, and resistance to care, ranging from 0 to 12, where a higher score indicates a greater frequency of aggressive behavior.²⁶

Based on a review of the literature and pilot inquiry in the LTCFs, we developed a list of NPIs

potentially available for LTCF residents with cognitive impairment, in order to ask if they had participated in these therapies (presented in [TABLE 1](#)).

The study received approval from the relevant University Ethics Committee (no. 122.6120.31.2015), and written informed consent was obtained from all the facilities involved.

Statistical analysis First, we used descriptive statistics to compare the NH and RH populations and residents with different levels of cognitive impairment in terms of participation in relevant NPI ([TABLE 2](#)). Next, we investigated (using the χ^2 test or the Fisher exact test) the associations between facility and resident characteristics and participation in different forms of NPIs ([TABLE 3](#)). We presented the percentages of residents participating in different forms of NPIs in each LTCF, and calculated the relevant variation coefficients between facilities ([TABLE 4](#)). To describe data presented in [TABLES 2 to 4](#) and in Supplementary material, *Table S1* and *S2*, we used counts and percentages for qualitative variables and mean (SD), range, median, and interquartile ranges for quantitative variables. We also used the Spearman rank correlation

TABLE 2 A comparison of nonpharmacological therapies in patients with cognitive impairment residing in nursing and residential homes and different levels of cognitive impairment in a random sample of 455 residents from 23 long-term care facilities in Poland

Nonpharmacological therapies		Total (n = 455)	Facility type			Level of cognitive impairment ^a			
			Nursing home (n = 214)	Residential home (n = 241)	<i>P</i> value	Mild (n = 164)	Moderate (n = 100)	Severe (n = 191)	<i>P</i> value
MR	Physiotherapy	272 (59.9)	145 (68.1)	127 (52.7)	0.001	92 (56.1)	57 (57)	123 (64.7)	0.20
	Physical therapy	166 (36.6)	87 (40.8)	79 (32.8)	0.08	50 (30.5)	38 (38)	78 (41.1)	0.11
	Breathing exercises	172 (37.9)	84 (39.4)	88 (36.5)	0.52	58 (35.4)	38 (38)	76 (40)	0.67
Maintaining and enhancing ADL		103 (22.7)	52 (24.4)	51 (21.2)	0.41	24 (14.6)	29 (29)	50 (26.3)	0.008
PA group		187 (41.2)	63 (29.6)	124 (51.5)	<0.001	82 (50)	49 (49.0)	56 (29.5)	<0.001
OT	Group occupational classes	253 (55.7)	131 (61.5)	122 (50.6)	0.020	96 (58.5)	62 (62)	95 (50)	0.10
	Maintenance of patient's interests	194 (42.7)	97 (45.5)	97 (40.2)	0.26	57 (34.8)	53 (53)	84 (44.2)	0.013
	Art therapy	58 (12.8)	32 (15)	26 (10.8)	0.18	23 (14)	14 (14)	21 (11.1)	0.65
CT	Memory training	114 (25.2)	70 (33)	44 (18.3)	<0.001	29 (17.7)	33 (33)	52 (27.5)	0.013
	Reality orientation training	129 (28.4)	70 (32.9)	59 (24.5)	0.048	29 (17.7)	36 (36)	64 (33.7)	0.001
	Reminiscence therapy	92 (20.3)	61 (28.6)	31 (12.9)	<0.001	21 (12.8)	25 (25)	46 (24.2)	0.012
	Sensory and multisensory stimulation interventions	71(15.6)	47 (22.1)	24 (10)	<0.001	13 (7.9)	15 (15)	43 (22.6)	0.001
	Validation therapy	103 (22.7)	60 (28.2)	43 (17.8)	0.009	30 (18.3)	25 (25)	48 (25.3)	0.24
PT		110 (24.2)	73 (34.3)	37 (15.4)	<0.001	35 (21.3)	27 (27)	48 (25.3)	0.53
Average time involved in nonpharmacological therapies	None	61 (13.5)	17 (8.0)	44 (18.2)	0.005	20 (12.2)	13 (13)	28 (14.8)	0.24
	Little (<1/3 of leisure time)	227 (50.1)	109 (51.4)	118 (49)		73 (44.5)	53 (53)	101 (53.4)	
	Most (>1/3 of leisure time)	165 (36.4)	86 (40.6)	79 (32.8)		71 (43.3)	34 (34)	60 (31.7)	

Data are presented as number (percentage) of patients. Data were missing on the average time involved in nonpharmacological therapies in 2 patients.

a Based on the Cognitive Performance Scale: mild cognitive impairment, 2 points; moderate, 3–4 points; and severe, 5–6 points

Abbreviations: see [TABLE 1](#)

analysis to assess the association between percentages of residents participating in specific NPIs in these facilities ([TABLE 5](#)). Furthermore, we applied a multivariable logistic regression analysis to find factors increasing the chance for residents to receive CT ([TABLE 6](#)). We included only variables which were significant in the original univariable analysis or were clinically justified. Interaction of each of them was tested to assess their combine effect on a dependent variable. In the final multivariable regression model, all variables with a statistically significant *P* value were retained. Differences were considered statistically significant if the *P* value was less than 0.05. Analyses were performed with SPSS 25 for Windows (IBM Corporation, Chicago, Illinois, United States).

RESULTS The study group included 455 LTCF residents with cognitive impairment who were

randomly selected from 23 LTCFs (91.7% of RHs and 36.4% of NHs were public nonprofit institutions). The access to physiotherapists, psychologists, physicians, and nurses was better for residents in NHs than in RHs. Overall, 70.3% of residents had been in a LTCF setting for more than 12 months, ranging from 57% in NH to 82.2% in RH (*P* < 0.001) (see Supplementary material, *Table S1*). A mean (SD) age at the time of data collection for men was 72 (12) years and 80.9 (11.1) years for women (*P* < 0.001). The majority of residents (70.1%) were women. The most important characteristics are shown in the first column in [TABLE 3](#) and in Supplementary material, *Table S2*. Detailed characteristics of the residents have been published elsewhere,⁴ showing that more NH residents as compared with RHs were severely dependent on carers when performing ADLs (79.8% vs 44.4%), and had severe cognitive impairment

(52.3% vs 32.8%). NH residents also had worst functional and nutritional status, often had psychotic symptoms, but did not differ significantly from RH residents in most other aspects of health status and other NPS (depression, agitation, wandering, aggressive behaviors).

Nonpharmacological interventions depending on the facility type

Most of the LTCF residents received OT (73.4%), and MR (67.2%); however, less than half of them participated in CT (44.8%), and PA (41.2%), and the lowest number of individuals received PT (24.2%) and ADL enhancement/maintenance (22.7%). In total, 89.2% of residents with cognitive impairment participated in at least a single NPI; this was more often observed in NH residents (97.2% vs 82.2%, respectively; $P < 0.001$). The preliminary descriptive analysis showed that NH residents with cognitive impairment significantly more often received MR, PT, and various forms of CT when compared with RH residents. However, NH residents were less often beneficiaries of PA including senior exercise and fitness (TABLE 2).

Nonpharmacological interventions depending on the level of cognitive impairment

Furthermore, there were differences between residents with regard to their level of cognitive impairment. Residents with moderate or severe cognitive decline, irrespectively of whether they were living in NH or RH, were more often involved with encouragement to maintain ADL and CT. Maintenance of residents' individual interests in relation to OT activity was also more often offered to residents with moderate cognitive impairment. However, PA interventions involved higher numbers of residents with mild or moderate cognitive impairment compared with individuals with severe cognitive impairment. Participation in MR, art therapy, group occupational classes, and PT was not related to the level of cognitive impairment. NH residents spent more time in therapies compared with RH residents, but the level of cognitive impairment did not affect the average length of time they were involved in NPIs (TABLE 2). CT and PT were significantly more often used in the private nonprofit LTCFs, whereas in the smaller facilities (up to 52 beds) statistically more residents were treated with MR, OT, and PT.

Nonpharmacological interventions in relation to resident characteristics

The use of NPIs also varied depending on resident characteristics such as age, gender, ability to undertake ADLs, and presence of NPS (TABLE 3). Younger residents were more involved in PA and OT compared with older ones. Women more often participated in CT and PT compared with men. Among residents with moderate ADL dependency, enhancing ADL (32.8%) and involvement in OT (84.0%) were more frequent. Severely ADL-dependent residents were less likely to participate in senior fitness exercise (only 26.4%) than those who required moderate

or no help with ADL. However, in the same severely ADL-dependent group, 69.7% of residents were involved in MR to restore their physical functioning, and the ADL level had no negative impact on their participation in it. CT was more frequently provided to those diagnosed with depression (71.7%), delusions (62.7%), or agitation (51.8%). Residents showing signs of wandering received less MR and PT. Furthermore, we found that residents who demonstrated distressed behavior, socially inappropriate behavior, or resistance to care were statistically more frequently involved in CT and enhancement of ADLs, as well. In addition, the individuals with symptoms of verbal abuse more often were included in enhancing ADLs.

Variation in nonpharmacological interventions in nursing and residential homes

We noted (on the basis of the results of coefficient of variation) that there was a wide distribution among NHs and RHs in relation to the proportion of residents participating in enhancing their own skills towards ADL, PA, and PT. Lower diversity between facilities was observed with regard to OT and MR. The use of CT varied more in RHs than in NHs (TABLE 4). Moreover, we found a significant positive correlation between the use of MR and PT ($\rho = 0.692$; $P < 0.001$), which means that in the facilities with higher use of MR, PT was also more often available. A significant positive correlation between participation in ADLs enhancement and CT ($\rho = 0.677$; $P < 0.001$), and PT ($\rho = 0.482$; $P = 0.020$) shows that in the facilities where residents were encouraged to enhance their skill in ADL, also CT and PT were more often available (TABLE 5). We also tested the relationship between participation in NPIs and the use of drugs (including psychotropic and antimentia medicines), and no correlation was found.

Factors associated with receiving cognitive therapy

Because the aim of our study was to evaluate availability of CT in LTCFs, we tested variables associated with a higher chance to receive such therapy (TABLE 6). We found that the chance of participating in CT was higher if patients were female, resided in NHs, or in a larger LTCF and were diagnosed with depression or delusions. The residents with moderate cognitive impairment were over twice more likely to receive CT compared with those with mild cognitive impairment. Residents with AD were not seen to participate in CT, unless they presented with aggressive behaviors (assessed with ABS). Residents with AD and aggressive behaviors had a 2.1 higher chance to participate in CT when compared with residents without both AD and aggressive behaviors, a 4.6 higher chance compared with residents with AD but without aggressive behaviors, and a 2.4 higher chance when compared with residents with aggressive behaviors but without AD. On the contrary, psychiatric disease other than depression and dementia decreased that chance by 78%.

TABLE 3 Nonpharmacological therapies in residents with cognitive impairment in relation to their characteristics, health issues, and behavioral symptoms (continued on the next page)

Characteristic	Total sample (n = 455)	Missing data, n	Nonpharmacological therapies among LTCF residents with cognitive impairment												
			MR (n = 305)		Maintaining and enhancing ADL (n = 103)		PA group (n = 187)		OT (n = 334)		CT (n = 204)		PT (n = 110)		
			Value	P value	Value	P value	Value	P value	Value	P value	Value	P value	Value	P value	
Facility															
Type	NHs	214 (47)	–	157 (73.7)	0.005	52 (24.4)	0.41	63 (29.6)	<0.001	164 (77)	0.12	111 (52.1)	0.004	73 (34.3)	<0.001
	RHs	241 (53)		148 (61.4)		51 (21.2)		124 (51.5)		170 (70.5)		93 (38.6)		37 (15.4)	
Size ^a	Small	193 (42.4)	–	140 (72.9)	0.026	40 (20.8)	0.42	52 (27.1)	<0.001	155 (80.7)	0.003	69 (35.9)	0.001	57 (29.7)	0.020
	Large	262 (57.6)		165 (63)		63 (24)		135 (51.5)		179 (68.3)		135 (51.5)		53 (20.2)	
Status	Public	300 (65.9)	–	198 (66.2)	0.55	62 (20.7)	0.17	122 (40.8)	0.82	212 (70.9)	0.07	118 (39.5)	0.001	56 (18.7)	<0.001
	Private	155 (34.1)		107 (69)		41 (26.5)		65 (41.9)		122 (78.7)		86 (55.5)		54 (34.8)	
Resident															
Sex	Female	319 (70.1)	–	216 (67.9)	0.61	77 (24.2)	0.24	126 (39.6)	0.30	236 (74.2)	0.63	158 (49.7)	0.002	87 (27.4)	0.017
	Male	136 (29.9)		89 (65.4)		26 (19.1)		61 (44.9)		98 (72.1)		46 (33.8)		23 (16.9)	
Age, y	<65	72 (15.8)	–	52 (72.2)		22 (30.6)		40 (55.6)		58 (80.6)		27 (37.5)		16 (22.2)	
	65–74	78 (17.1)		56 (72.7)	0.40	20 (26)	0.23	37 (48.1)	0.005	52 (67.5)	0.015	39 (39)	0.24	22 (28.6)	0.80
	75–84	148 (32.6)		97 (65.5)		30 (20.3)		59 (39.9)		119 (80.4)		73 (49.3)		35 (23.6)	
	≥85	157 (34.5)		100 (63.7)		31 (19.7)		51 (32.5)		105 (66.9)		74 (47.1)		37 (23.6)	
ADL dependency ^b	No	52 (11.5)	1	35 (68.6)		7 (13.7)		33 (64.7)		38 (74.5)		15 (29.4)		13 (25.5)	
	Moderate	125 (27.5)		76 (60.8)	0.21	41 (32.8)	0.004	81 (64.8)	<0.001	105 (84)	0.006	58 (46.4)	0.06	33 (26.4)	0.76
	Severe	277 (61)		193 (69.7)		54 (19.5)		73 (26.4)		191 (69)		130 (46.9)		64 (23.1)	
Cognitive impairment ^c	Mild	164 (36)	–	102 (62.2)		24 (14.6)		82 (50)		122 (74.4)		55 (33.5)		35 (21.3)	
	Moderate	100 (22)		65 (65)	0.10	29 (29)	0.008	49 (49)	<0.001	84 (84)	0.009	57 (57)	<0.001	27 (27)	0.53
	Severe	191 (42)		138 (72.6)		50 (26.3)		56 (29.5)		128 (67.4)		92 (48.4)		48 (25.3)	
Alzheimer disease	Yes	55 (12.2)	5	34 (61.8)	0.40	14 (25.5)	0.58	26 (47.3)	0.37	40 (72.7)	0.89	31 (56.4)	0.07	15 (27.3)	0.55
	No	395 (87.8)		266 (67.5)		87 (22.1)		161 (40.9)		290 (73.6)		170 (43.1)		93 (23.6)	
Dementia other type than AD	Yes	271 (60.2)	5	182 (67.2)	0.85	58 (21.4)	0.49	104 (38.4)	0.11	199 (73.4)	0.97	118 (43.5)	0.60	65 (24)	0.97
	No	179 (39.8)		118 (66.3)		43 (24.2)		82 (46.1)		131 (73.6)		82 (46.1)		43 (24.2)	
Diagnosis of depression	Yes	46 (10.3)	7	34 (73.9)	0.29	15 (32.6)	0.08	17 (37)	0.51	38 (82.6)	0.15	33 (71.7)	<0.001	15 (32.6)	0.17
	No	402 (89.7)		266 (66.2)		85 (21.1)		169 (42)		292 (72.6)		167 (41.5)		94 (23.4)	
Psychiatric diseases	Yes	24 (5.3)	3	12 (50)	0.07	1 (4.2)	0.028	13 (54.2)	0.19	16 (66.7)	0.44	5 (20.8)	0.016	5 (20.8)	0.70
	No	428 (94.7)		290 (67.9)		100 (23.4)		173 (40.5)		315 (73.8)		196 (45.9)		104 (24.4)	
Hallucinations	Yes	73 (16.2)	3	48 (65.8)	0.78	18 (24.7)	0.61	15 (20.5)	<0.001	55 (75.3)	0.68	39 (53.4)	0.10	14 (19.2)	0.28
	No	379 (83.8)		255 (67.5)		83 (22)		171 (45.2)		276 (73)		162 (42.9)		95 (25.1)	

TABLE 3 Nonpharmacological therapies in residents with cognitive impairment in relation to their characteristics, health issues, and behavioral symptoms (continued from the previous page)

Characteristic	Total sample (n = 455)	Missing data, n	Nonpharmacological therapies among LTCF residents with cognitive impairment											
			MR (n = 305)				Mantaining and enhancing ADL (n = 103)				PA group (n = 187)			
			Value	P value	Value	P value	Value	P value	Value	P value	Value	P value	Value	P value
Delusions	Yes	110 (24.4)	4											
	No	341 (75.6)												
Agitation	Yes	137 (30.3)	3											
	No	315 (69.7)												
Behavioral problem (in the last 3 days)														
Wandering	Yes	102 (22.7)	5											
	No	348 (77.3)												
Verbal abuse	Yes	121 (26.8)	4											
	No	330 (73.2)												
Physical abuse	Yes	73 (16.3)	7											
	No	375 (83.7)												
Socially inappropriate behavior	Yes	148 (32.8)	4											
	No	303 (67.2)												
Resistance to care	Yes	148 (32.7)	2											
	No	305 (67.3)												

Data are presented as number (percentage) of patients.

a Facility size was based on the median number of beds in long-term care facilities in Poland: a small facility is up to 52 beds and a large facility, above 52 beds

b Based on the Activities of Daily Living Hierarchy scale: minimal limitations, 0–1 points; moderate, 2–3 points; and severe, 4–6 points

c Based on the Cognitive Performance Scale: mild cognitive impairment, 2 points; moderate, 3–4 points; and severe, 5–6 points

Data were missing on activities of daily living dependency status in 1 patient; Alzheimer disease, 5; dementia, 5; diagnosis of depression, 7; psychiatric diseases other than depression and dementia, 3; hallucinations, 3; delusions, 4; agitation, 3; wandering, 5; verbal abuse, 4; physical abuse, 7; socially inappropriate behavior, 4; resistance to care, 2.

Abbreviations: AD, Alzheimer disease, ADL, activities of daily living; LTCF, long-term care facility; NH, nursing home; RH, residential home; others, see [TABLE 2](#)

TABLE 4 Diversity in nonpharmacological therapies among nursing homes and residential homes based on percentages of residents with cognitive impairment receiving certain therapies

Therapy	NH (n = 11)		RH (n = 12)	
	Mean (SD)	Coefficient of variation ^a , %	Mean (SD)	Coefficient of variation ^a , %
MR	14.27 (7.62)	53.37	12.33 (6.83)	55.35
Maintaining and enhancing ADL	4.73 (5.92)	125.18	4.25 (6.50)	152.86
PA group	5.73 (6.17)	107.66	10.33 (5.40)	52.25
OT	14.91 (4.68)	31.38	14.17 (4.67)	32.95
CT	10.09 (7.63)	75.66	7.75 (7.25)	93.55
PT	6.64 (7.54)	113.62	3.08 (3.65)	118.53

a The coefficient of variation is defined as the ratio of the standard deviation to the mean. It is a statistical measure of the dispersion of data points in a data series around the mean. The higher the coefficient of variation, the greater the variation in the sample.

Abbreviations: see TABLES 1 and 3

TABLE 5 Spearman rank correlation coefficient between the levels of use of certain nonpharmacological interventions in long-term care facilities (n = 23)

Type of therapies	Spearman rank correlation	MR	Maintaining and enhancing ADL	PA group	OT	CT	PT
MR	rho ^a	1.000					
	P value	.					
Maintaining and enhancing ADL	rho	0.396	1.000				
	P value	0.06	.				
PA group	rho	0.114	0.362	1.000			
	P value	0.60	0.09	.			
OT	rho	0.257	0.378	−0.025	1.000		
	P value	0.24	0.08	0.91	.		
CT	rho	0.307	0.677	0.170	0.333	1.000	
	P value	0.15	<0.001	0.44	0.12	.	
PT	rho	0.692	0.482	0.385	0.404	0.384	1.000
	P value	<0.001	0.020	0.07	0.06	0.07	.

a Spearman rank correlation coefficient (rho): correlation between the levels of use of certain nonpharmacological interventions in LTCFs

Abbreviations: see TABLE 1

DISCUSSION There is considerable discussion in the literature about polypharmacy²⁷⁻²⁹ and its negative effects in older adults residing in LTCFs, and as a result, the need to reduce medications.^{6,30,31} This is of particular relevance for LTCF residents with cognitive impairment and NPS taking psychotropics. In our previous study,³² we reported that antidementia medications (donepezil, rivastigmine, and memantine) were rarely prescribed (13.4%), and when they were prescribed, it was for residents with AD diagnosis. The residents with other dementias received other psychostimulants (piracetam, vinpocetine) (14.3%) with 46.4% of patients with cognitive impairment receiving antipsychotics (27.9% received typical antipsychotic medicines and 24.2% atypical ones), which is a considerably higher percentage when compared with data from the European,^{29,33} United States,⁶ and Canadian³⁴ studies. Moreover, prescribing of anxiolytics (28.4%)

(predominating hydroxyzine) was very frequent despite the fact it is not recommended for people with cognitive impairment. Hence, the deprescribing of psychotropics, or at least reduction of their doses, seems to be a serious challenge for physicians in Polish LTCFs. Therefore, the main goal of the current analysis was to assess availability of nonpharmacological alternatives of therapies in these settings, which might help with decreasing the use of pharmacological restraints.

Medical rehabilitation MR is indicated in specific somatic diseases. In our study, it was more often performed in NHs (in 73.3% residents), where most of residents had a worse functional status, and had been admitted with the aim to improve their independence in performing ADL. The level of cognitive impairment had no impact on the use of MR, which indicates that such programs were used mainly to restore physical

TABLE 6 Factors associated with cognitive therapies in long-term care facility residents with cognitive impairment: the results of multivariable logistic regression analysis

Variables	OR	95% CI	P value
Facility type (NH vs RH) ^a	2.787	1.688–4.601	<0.001
Facility size (large vs small) ^b	4.086	2.451–6.810	<0.001
Sex (female vs male)	1.872	1.152–3.042	0.011
Cognitive impairment ^c	Mild	1	
	Moderate	2.274	1.268–4.077
	Severe	1.415	0.849–2.361
Delusions	2.309	1.340–3.979	0.003
Depression	5.073	2.309–11.144	<0.001
Psychiatric diseases ^d	0.215	0.067–0.692	0.010
Alzheimer disease	0.461	0.149–1.426	0.18
Aggressive behavior (ABS, 1–6 points vs ABS, 0 points) ^e	0.883	0.541–1.440	0.62
Alzheimer disease and aggressive behavior ^f	5.254	1.279–21.578	0.021
Constant	0.076	0.037–0.155	<0.001

a Facility type: nursing home or residential home

b Facility size was based on the median number of beds in LTCFs in Poland: a small facility is up to 52 beds and a large facility, above 52 beds

c Based on the Cognitive Performance Scale: mild cognitive impairment, 2 points; moderate, 3–4 points; and severe, 5–6 points

d Psychiatric diseases except depression and dementia

e Based on the Aggressive Behavior Scale (ABS): no signs of aggressive behavior, 0 points; mild to severe aggressive behaviors, 1–6 points

f Effect of interaction between variables Alzheimer disease and aggressive behavior means that residents with Alzheimer disease and aggressive behaviors had a higher chance of participating in CT by: $5.254 \times 0.461 \times 0.883 = 2.131$ when compared with residents without Alzheimer disease and without aggressive behavior; or $5.254 \times 0.883 = 4.639$ when compared with residents with Alzheimer disease and without aggressive behavior; or $5.254 \times 0.461 = 2.422$ when compared with residents without Alzheimer disease and with aggressive behavior.

Abbreviations: OR, odds ratio; others, see TABLES 2 and 3

functioning, independent of cognition capacity. For patients with dementia, such therapies need to be adapted to compensate cognitive and perceptual capacities or mood, and so may require time, adaptive tools, organizing staff in a different way, new communication strategies, and additional resources. Based on a study by Rogers et al,³⁵ residents with dementia may benefit from rehabilitation by becoming more appropriately involved in their care and being less disruptive. Therefore, it is extremely important that they are not excluded from such a program since they can benefit from rehabilitation-based services similarly to nondemented individuals.³⁶

Physical activity group There is evidence that physical exercise training has a positive effect on cognitive function in older adults with dementia, both living at home and also in LTCFs^{11–13,37} and may slow down the course of the disease if started early on in the disease process.¹³ A systematic review of randomized controlled trials of NH

residents with dementia showed that there was a higher performance in terms of cognition, mobility, and functional ability, improved mood, and decreased agitation when physical exercise such as walking, music and movement, hand exercise, and multimodal interventions were introduced.¹² The meta-analysis of the effects of both CT and PA also showed significant improvement in undertaking ADL and mood.³⁷ Therefore, regular exercise (twice a week) is strongly recommended to be started early on in mild cognitive impairment as part of the overall management approach.^{7,8} In our study, about half of residents with mild or moderate cognitive impairment were involved in the PA classes more frequently than residents with severe impairment. It was more often offered in RHs, probably due to the greater physical ability of these residents. Nevertheless, greater effort should be made to motivate frail older people to participate more in physical activity.

Maintaining and enhancing activities of daily living

There is strong evidence that for people with dementia, enhancing individual ADL can promote greater independence in personal care (eg, eating, dressing, toileting, and washing), lead to less disruption during ADL performance,³⁸ and maximize the use of skills and participation in self-care.^{39,40} In our study sample, encouraging individual ADL was more often offered to the residents with moderate and severe cognitive impairment, because ADL decline is strongly related to loss of cognitive functions. However, it is noteworthy that less than one-third of residents of NHs and RHs in Poland were encouraged to maintain their own ADL functioning, despite its importance in relation to greater independence. In our study, we found a significant positive correlation between enhancing individual ADL and CT, and between encouraging greater independence in ADL and PT, which demonstrates that there are facilities where residents have opportunity to participate in the combined NPIs. There is evidence that encouraging independence in ADL combined with other NPIs results in better general functioning compared with single intervention.⁴¹

Cognitive therapy In our sample, CT was administered in 44.8% of residents with cognitive impairment, significantly more often in the larger NHs where more clinical professionals (psychologists, physiotherapists and occupational therapists) are employed. Different types of CT were offered more often to residents with moderate or severe cognitive impairment. However, only 15% to 36% moderately impaired residents took part in at least one type of such therapy (TABLE 2). The use of CT was higher among residents with moderate cognitive impairment, presenting signs of depression, delusions, or AD with aggressive behaviors. It seems that the presence of behavioral symptoms causing problems for caregivers while providing personal care may increase the chance of referral to CT. Such therapy plays a pivotal role

in optimizing cognitive function, and commencement is recommended early in mild cognitive impairment.^{7,8} Recently, new approaches have been tested and showed to be effective in people with mild cognitive impairment, for example a multimodal CT in combination with cognitive training and stimulation, reality orientation, physical, reminiscence, and music therapies.⁴² Also individual goal-oriented cognitive rehabilitation showed improvement in everyday functioning.⁴³ Moreover, a systematic review of cognition-oriented treatments provided promising evidence of the effectiveness of cognitive training, cognitive rehabilitation and stimulation for the prevention of cognitive and functional decline.⁴⁴ In our study, however, CT was applied more often in moderate (57%) and severe cognitive impairment (48.4%), while majority of residents in early-stage dementia lost such therapeutic opportunities (33.5%).

Occupational therapy–type activity In Poland, OT is very common in LTCFs and was therefore available in all NHs and RHs in the study. In total, 73.4% of residents with cognitive impairment participated in OT with the highest involvement of individuals with moderate cognitive impairment and with moderate ADL dependency. In other studies, OT was demonstrated to have positive effects on improving emotional well-being, sense of self-efficacy, and level of personal independence in ADL functioning, when residents participate in group therapy, rather than receive individual OT.^{9,10,45,46}

Psychological therapy A recent systematic review and meta-analysis of randomized controlled trials of psychological treatment for depression and anxiety in people with dementia found promising evidence that psychological therapies can be effective, and have the potential to improve patient well-being.⁴⁷ In our study, PT was applied to about one-third of NH residents, but only to 15.4% of RH residents with cognitive impairment, which might be due to the significantly lower employment rate of psychologists in RH (Supplementary material, *Table S1*). The level of cognitive impairment, presence of depression or other psychiatric disease had no impact on use of PT. It also may be due to an insufficient number of psychologists, which is a serious barrier for the development of PT and CT in Polish LTCFs.

Comparison of nursing and residential homes Awareness of the potential harm of polypharmacy should motivate physicians to prescribe NPIs and for managers to invest more in the implementation of NPIs making them available to every resident with cognitive impairment independent of the type of LTCF. It is especially important for individuals with mild cognitive impairment in order to slow down the progress of dementia and so enhance quality of life for longer. Modern technologies improve treatment of memory and behavioral disorders, but they require

appropriate staff training and increased funding for equipment and more specialists to undertake such NPI. We found that residents in NHs, especially in large facilities, had more opportunities than those in RHs to participate in the majority of the therapies (MR, CT, PT) because these facilities employ more staff. The highest use of MR and OT was probably associated with the main goal at admission to the NH, that is, rehabilitation and then return home (Supplementary material, *Table S1*). On the contrary, RH residents were more often involved in gymnastics and exercises to maintain good shape and health. The NPIs were applied mostly to residents with moderate to severe cognitive impairment; however, starting such interventions earlier in the stage of cognitive impairment is now highly recommended.

Strengths and limitations This is an epidemiological cross-sectional study, which, in contrary to a longitudinal study design, cannot explain cause-effect relation between symptoms and use of NPIs. Moreover, we could not make a direct comparison with other studies conducted in Europe and United States because the meaning and range of different therapies differ between countries and is strongly associated with local organizational regulations. However, it is worth highlighting that this is the first national research in Poland with a large sample size of residents with cognitive impairment randomly selected from 2 types of LTCFs representative of the entire country. It provides unique information on the use of NPIs in residents of NHs and RHs, and reveals important differences between these facilities in terms of organization and human resources. Additionally, factors associated with using CT in NHs and RHs were identified.

Conclusions Nonpharmaceutical interventions are generally recommended as the first-line treatment of NPS in people with cognitive impairment. In our study we found the following:

- There was a relatively high use of MR and OT by residents with cognitive impairment in all LTCFs, but a significant diversity between NHs and RHs in the use of other therapies: CT, PT, PA and enhancing independence in ADL.
- In facilities where residents were encouraged in their ADL, also CT and PT were more often used. Significant correlation was found also between MR and PT use.
- CT was more likely to be provided to LTCF residents who had depression, delusions, or AD accompanied by behavioral disorders, and less likely to residents with other psychiatric diseases.

Due to the growing number of residents in LTCFs with dementia, more effort should be undertaken for implementing psychological and cognitive therapies, and making them available to each resident with cognitive impairment independent of the type of long-term care facility. It is important to slow down the development of dementia especially in people with mild cognitive impairment.

SUPPLEMENTARY MATERIAL

Supplementary material is available at www.mp.pl/paim.

ARTICLE INFORMATION

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