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

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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.¹² 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

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

ABSTRACT

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.
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.\textsuperscript{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.\textsuperscript{2,3} A number of studies have highlighted the effectiveness of nonpharmacological therapies such as occupational therapy,\textsuperscript{9,10} exercise trainings,\textsuperscript{11-13} music therapy,\textsuperscript{14,15} art therapy,\textsuperscript{14,15} or cognitive and behavioral interventions.\textsuperscript{14,19}

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 study\textsuperscript{9} as well as the comparison of organization of both types of the facilities\textsuperscript{3} 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).\textsuperscript{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 Examination\textsuperscript{21} and the Montreal Cognitive Assessment.\textsuperscript{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 53 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 form 2015 to 2016 using the interRAI-LTCF questionnaire\textsuperscript{23} 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 evaluation the health and functional status of LTCF residents, and their care needs.\textsuperscript{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)                                                            | 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. |
| OT-type activity               | Maintaining patient’s interests by regular reading, listening to the radio, and watching TV                                              | 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. |
| 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; orientation in reality and environment through repetition of information about surroundings, relatives, time, etc; evoking memories; 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                                                                                                                      |                                                                                                                                                |
| 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 classes                                                                                                                               |                                                                                                                                                |
|                              | Art therapy as part of occupational therapy                                                                                             |                                                                                                                                                |
|                              | 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. |

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);\(^{35}\);
- 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.\(^{28}\)

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 \( \chi^2 \) 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

\(^{35}\)
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, 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.

### 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* | P value | P value |
|-----------------------------|----------------|--------------|--------------------------------|---------|---------|
|                             | Nursing home (n = 214) | Residential home (n = 241) | Mild (n = 164) | Moderate (n = 100) | Severe (n = 191) | | |
| 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

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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, 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.

**RESULTS** The study group included 455 LTCF residents with cognitive impairment who were...
(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 antidementia 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 |
|----------------|------------------------|-----------------|
| Facility Type  |                        |                 |
| NHs            | 214 (47)               | –               |
| RHs            | 241 (53)               |                 |
| Sizea          |                        |                 |
| Small          | 193 (42.4)             | –               |
| Large          | 262 (57.6)             |                 |
| Status         |                        |                 |
| Public         | 300 (65.9)             | –               |
| Private        | 155 (34.1)             |                 |
| Resident Sex   |                        |                 |
| Female         | 319 (70.1)             | –               |
| Male           | 136 (29.9)             |                 |
| Age, y         |                        |                 |
| <65            | 72 (15.8)              | –               |
| 65–74          | 78 (17.1)              |                 |
| 75–84          | 148 (32.6)             |                 |
| ≥85            | 157 (34.5)             |                 |
| ADL dependencyb|                        |                 |
| No             | 52 (11.5)              | 1               |
| Moderate       | 125 (27.5)             |                 |
| Severe         | 277 (61)               |                 |
| Cognitive impairmentc |                |                 |
| Mild           | 164 (36)               | –               |
| Moderate       | 100 (22)               |                 |
| Severe         | 191 (42)               |                 |
| Alzheimer disease |                        |                 |
| Yes            | 55 (12.2)              | 5               |
| No             | 395 (87.8)             |                 |
| Dementia other type than AD |                |                 |
| Yes            | 271 (60.2)             | 5               |
| No             | 179 (39.8)             |                 |
| Diagnosis of depression |                |                 |
| Yes            | 46 (10.3)              | 7               |
| No             | 402 (89.7)             |                 |
| Psychiatric diseases |                |                 |
| Yes            | 24 (5.3)               | 3               |
| No             | 379 (84.7)             |                 |
| Hallucinations |                        |                 |
| Yes            | 73 (16.2)              | 3               |
| No             | 379 (83.8)             |                 |

| 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 |
| 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 |
| 148 (61.4) | 0.211 | 51 (21.2) | 0.12 | 124 (51.5) | 0.30 | 170 (70.5) | 0.42 | 93 (38.6) | 0.15 | 37 (15.4) | 0.06 |
| 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 |
| 165 (63) | 0.012 | 63 (24) | 0.012 | 135 (51.5) | 0.012 | 179 (68.3) | 0.03 | 135 (51.5) | 0.012 | 53 (20.2) | 0.012 |
| 198 (66.2) | 0.05 | 62 (20.7) | 0.17 | 122 (40.8) | 0.02 | 212 (70.9) | 0.07 | 118 (39.5) | 0.01 | 56 (18.7) | <0.001 |
| 107 (69) | 0.012 | 41 (26.5) | 0.012 | 65 (41.9) | 0.012 | 122 (78.7) | 0.012 | 86 (55.5) | 0.012 | 54 (34.8) | 0.012 |

a: Small vs. Large; b: No vs. Moderate vs. Severe; c: Mild vs. Moderate vs. Severe.
### 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)           | 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 |
| Delusions                       | Yes   | 110 (24.4) | 4 | 76 (69.1) | 0.69 | 35 (31.8) | 0.008 | 42 (38.2) | 0.44 | 88 (80) | 0.08 | 69 (62.7) | <0.001 | 31 (28.2) | 0.29 |
|                                 | No    | 341 (75.6) | 228 (67.1) | 0.69 | 67 (19.7) | 0.008 | 144 (42.4) | 0.44 | 243 (71.5) | 0.08 | 132 (38.8) | 0.44 |
| Agitation                       | Yes   | 137 (30.3) | 3 | 88 (64.2) | 0.38 | 36 (26.3) | 0.19 | 54 (39.4) | 0.60 | 101 (73.7) | 0.92 | 71 (51.8) | 0.047 | 27 (19.7) | 0.13 |
|                                 | No    | 315 (69.7) | 215 (68.5) | 0.38 | 65 (20.7) | 0.19 | 132 (42) | 0.60 | 230 (73.2) | 0.92 | 131 (41.7) | 0.047 | 83 (26.4) |
| Behavioral problem (in the last 3 days) | | | | |
| Wandering                       | Yes   | 102 (22.7) | 5 | 50 (49) | <0.001 | 24 (23.5) | 0.77 | 43 (42.2) | 0.89 | 75 (73.5) | 0.96 | 48 (47.1) | 0.55 | 16 (15.7) | 0.019 |
|                                 | No    | 348 (77.3) | 253 (72.7) | 0.77 | 77 (22.1) | 0.008 | 144 (41.4) | 0.89 | 255 (73.3) | 0.96 | 152 (43.7) | 0.96 | 94 (27) |
| Verbal abuse                    | Yes   | 121 (26.8) | 4 | 79 (65.3) | 0.56 | 40 (33.1) | 0.001 | 48 (39.7) | 0.64 | 95 (78.5) | 0.14 | 57 (47.1) | 0.51 | 27 (22.3) | 0.53 |
|                                 | No    | 330 (73.2) | 225 (66.2) | 0.56 | 62 (18.8) | 0.001 | 139 (42.1) | 0.64 | 236 (71.5) | 0.14 | 144 (43.6) | 0.64 | 83 (25.2) |
| Physical abuse                  | Yes   | 73 (16.3) | 7 | 52 (71.2) | 0.47 | 30 (41.1) | 0.001 | 27 (37) | 0.37 | 55 (75.3) | 0.69 | 41 (56.2) | 0.030 | 16 (21.9) | 0.60 |
|                                 | No    | 375 (83.7) | 251 (66.9) | 0.47 | 72 (19.2) | 0.001 | 160 (42.7) | 0.37 | 274 (73.1) | 0.69 | 159 (42.4) | 0.37 | 93 (24.8) |
| Socially inappropriate behavior | Yes   | 148 (32.8) | 4 | 96 (64.9) | 0.42 | 45 (30.4) | 0.006 | 56 (37.8) | 0.28 | 108 (73) | 0.89 | 76 (51.4) | 0.043 | 32 (21.6) | 0.34 |
|                                 | No    | 303 (67.2) | 208 (68.6) | 0.42 | 57 (18.8) | 0.006 | 131 (43.2) | 0.28 | 223 (73.6) | 0.89 | 125 (41.3) | 0.043 | 78 (25.7) |
| Resistance to care             | Yes   | 148 (32.7) | 2 | 99 (66.9) | 0.95 | 48 (32.4) | <0.001 | 48 (32.4) | 0.008 | 107 (72.3) | 0.68 | 79 (53.4) | 0.011 | 41 (27.7) | 0.24 |
|                                 | No    | 305 (67.3) | 205 (67.2) | 0.95 | 54 (17.7) | 0.008 | 139 (45.6) | 0.68 | 226 (74.1) | 0.008 | 124 (40.7) | 0.68 | 69 (22.6) |

Data are presented as number (percentage) of patients.

- **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**.
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Nonpharmacological therapies in LTCF residents with dementia

(49) predominating hydroxyzine) was very frequent despite the fact it is not recommended for people with cognitive impairment. Hence, the prescribing 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

DISCUSSION

There is considerable discussion in the literature about polypharmacy and its negative effects in older adults residing in LTCFs, and as a result, the need to reduce medications. This is of particular relevance for LTCF residents with cognitive impairment and NPS taking psychotropics. In our previous study, 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, United States, and Canadian 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 prescribing 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.

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#### Table 4

| Therapy                        | NH (n = 11) | Mean (SD) | Coefficient of variationa, % | RH (n = 12) | Mean (SD) | Coefficient of variationa, % |
|-------------------------------|-------------|-----------|-----------------------------|-------------|-----------|-----------------------------|
| 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

| Type of therapies | Spearman rank correlation | MR | Maintaining and enhancing ADL | PA group | OT | CT | PT |
|-------------------|---------------------------|----|-------------------------------|----------|----|----|----|
| MR                | rho<sup>a</sup>           | 1.00 |                             |          |    |    |    |
|                   | 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
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.[19] 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.[31] 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.[13] 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,[39] 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

### 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.[19] 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.[31] 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.[13] 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.

### 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 | 0.006  |
| Severe    | 1.415 | 0.849–2.361 | 0.18   |
| 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 |

More extensive details are provided in Table 2 and 3.

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

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1. Facility type: nursing home or residential home
2. 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
3. Based on the Cognitive Performance Scale: mild cognitive impairment, 2 points; moderate, 3–4 points; and severe, 5–6 points
4. Psychiatric diseases except depression and dementia
5. Based on the Aggressive Behavior Scale (ABS): no signs of aggressive behavior, 0 points; mild to severe aggressive behaviors, 1–6 points
6. 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 × 0.461 × 0.883 = 2.131 when compared with residents without Alzheimer disease and without aggressive behavior; or 5.254 × 0.883 = 4.639 when compared with residents with Alzheimer disease and without aggressive behavior; or 5.254 × 0.461 = 2.422 when compared with residents without Alzheimer disease and with aggressive behavior.
in optimizing cognitive function, and commencement is recommended early in mild cognitive impairment. 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. Also individual goal-oriented cognitive rehabilitation showed improvement in everyday functioning. 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. 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.

**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. 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/garm.

ARTICLE INFORMATION

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CONFLICT OF INTEREST None declared.

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