Assessment and physical activities of daily living among patients under long-term home care nursing

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ABSTRACT

Purpose: To assess the degree of independence in physical activities of daily living for patients under long-term in-home nursing care; to evaluate any changes in physical activities of daily living at entry and after 90 days of in-home nursing care.
Materials and methods: InterRAI-HC (Residental Assessment Instrument – Home Care) questionnaire was used as a tool according to the protocol and assessed patients at entry and again after 90 days. The participants consisted of 100 consecutive patients who were newly admitted to long-term in-home nursing care.
Results: The analysis of total dependence showed that more than 50% of patients were entirely dependent in eight out of ten specified physical activities of daily living (except mobility in bed and food consumption). Intention to treat analysis was performed; the percentages of patients totally dependent in performing eating and mobility in bed actions increased significantly by the 90-day follow-up. Also a comparison of the mean value of independence for analyzed activities did not change significantly over the 90 days, with the only exception being the mean value of independence for dressing up the upper part of the body, which significantly improved after 90 days per protocol analysis. A high mortality rate is noted among these patients (15% by the 90 day follow-up). This probably resulted from the restrictive qualification criteria used in Poland for patients to receive this form of in-home healthcare service.
Conclusions: The majority of patients who are under long-term in-home nursing care in Poland are entirely dependent when it comes to the physical activities of daily living.
Key words: home health care, community based care and services, long-term care, physical activity, daily living

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INTRODUCTION

In Poland, current legal regulations emphasize that one of the health priorities is the development of long-term healthcare services (including in-home care), with special consideration for compensating the loss of independence [1].

Since 2004, the National Health Fund (NHF) introduced a novel form of care: long-term in-home nursing care. It is a non-stationary form of care provided at the patient's home in perpetuity, or while the patient's ability to execute physical activities of daily living (P-ADLs) measured with the Barthel index remains within the range of 0-40 points (max. 100), which means they have a high degree of difficulty or total disability in activities of daily living. The loss of functional efficiency concerning physical activities of daily living causes limitations in functioning in the environment and dependence on other people's care. The degree of functional disability is a factor predicting need for nursing and household services. Disability in the sense of everyday life dysfunction may be regarded as an inability to be self-reliant, to independently care for oneself, and to perform P-ADLs, including self-service activities concerning personal hygiene, dressing up, consumption of food, and mobility [2].

The loss of functional efficiency in P-ADLs results in inability to live independently in one's own home and requires permanent help from a caretaker or placement in a caring institution [3]. The long-term in-home nursing care is provided in coordination with family doctors and family nurses, who still supervise the patient's treatment. All home care health services for eligible patients are provided free of charge. The nurses perform medical procedures (catheterization, wound care, administration of IV fluids, pressure ulcer care) and rehabilitation (bringing patient to sitting position, active and passive exercises), and also are responsible for the health education of patients and caretakers. One long-term nurse can provide healthcare services for a maximum of six patients living in their own houses [4].

Long-term in-home nursing care is available during weekdays from 8am to 8pm, whereas on Saturdays, Sundays, and public holidays it is restricted to medically justified cases. The frequency of home visits is determined by the National Health Fund and should not be less than four times a week for one patient [5].

Patients are admitted to this type of care regardless of age, type of chronic disease, or type of medical procedures required for those who do not want or cannot stay in stationary long-term care.

Since long-term in-home nursing care is a novel form of care in Poland (corresponding with the majority of Eastern European countries), it has not been a subject of extensive research or publication. Home nurses' role involves activities aimed at achieving a higher level of independence for patients. Because patients under home care in Poland are entirely or highly dependent, any improvement (or lack of deterioration) is important for patients' quality of life.

However, it is not known to what degree long-term home nursing care might affect patients' performance of daily living activities.

MATERIALS AND METHODS

Selection and Description of Participants

A total of 100 consecutive patients who were newly admitted to long-term in-home care nursing (healthcare services) with NHF contract in 2009-2010 took part in the study. Criteria employed in recruiting participants were: 1) official admission to long-term in-home care nursing in a given time range as well as 2) patients' written informed consent to take part in the study. Currently, ranks from 0 to 40 in the Barthel scale are regarded as a nation-wide, single criterion qualifying patients to this form of care and indicate self-care deficits concerning basic, physical activities of daily living. Long-term in-home care nursing is directed to patients who do not qualify for stationary care, who are not in acute phase of mental disease, and those who do not qualify for hospice admission.

Current study was carried out in two healthcare institutions in Bialystok and Siemiatycze, where the majority of healthcare services in a form of long-term in-home care nursing were provided in Podlaskie province. Patients were examined twice: at admission to long-term in-home care nursing and after 90 days of care. Descriptive analysis concerned all patients recruited to the study (N=100). Comparative analysis concerned 83 participants (83%) from both stages of the study out of 100 participants examined in the initial evaluation (per protocol analysis). The remaining 17 patients did not participate in the periodic examination after 90 days of care for external reasons: one of the patients was transferred to a stationary hospice; one was transferred to intensive care unit, the other 15 died. Additionally intention to treat analysis was performed for all 100 patients (where all 17 patients for which data were missing after 90 days were ascribed the lowest scores indicating total dependence in performing physical activities of daily living).

Measurements

InterRAI-HC (Residental Assessment Instrument – Home Care) questionnaire was used as a tool [6]. The InterRAI-HC was specifically designed for patients remaining in- home care and it provides wider and more detailed assessment of P-ADL when compared to routinely used Barthel's scale. The InterRAI-HC is designed for use at a patient's admission to home health, but its utility is

augmented by reassessment at same standard interval (e.g., 90 days), depending on the type of patients being assessed [7].

We used InterRAI-HC tool according to the protocol and assessed patients at entry and repeatedly after 90 days.

Part G of the questionnaire concerned physical functioning issues. Assessment concerned the degree of dependence from other people in ten P-ADLs such as: bathing, private hygiene, dressing up upper part of the body, dressing up lower part of the body, walking, moving, occupying and vacating the toilet, using toilet, mobility in bed and consumption of food.

Procedure

Each of the activities was assessed by direct observation by an observer (a nurse) on three consecutive visits upon admission and then mean score for each activity was given. Similar assessment took place after 90 days using the same part G of the questionnaire.

The scope of activities included in P-ADLs ranged:

1. Bathing with range definition: manner of bathing or taking a shower; includes entering and getting out of the bath/ shower as well as washing hands, lower and upper leg parts, chest, stomach and crotch regions.
2. Personal hygiene with range definition: hair combing/brushing, brushing teeth, beard shaving, applying make-up, face and hands washing and drying up.
3. Dressing up of the upper body part with range definition: manner in which patient takes off as well as puts on outdoor clothes, everyday clothes, underwear above waist including prosthesis, orthopaedic equipment, fasteners, sweaters etc.
4. Dressing up of the lower body part with range definition: manner in which patient takes off as well as puts on outdoor clothes, everyday clothes, underwear below waist including prosthesis, orthopaedic equipment, belts, trousers, skirts, shoes, fasteners.
5. Walking with range definition: manner of moving between rooms on the same floor inside building.
6. Moving with range definition: manner of moving between rooms on the same floor – by walking or using wheelchair, ability to use wheelchair independently.
7. Occupying and vacating the toilet seat with range definition: manner of occupying and vacating toilet seat or room toilet seat.
8. Using a toilet with range definition: manner of using the toilet, room toilet seat, basin, chamber, wiping up after using the toilet, changing diapers/pads, dealing with artificial anus or catheter, fixing clothes.
9. Mobility in bed with range definition: manner of lying down and getting up from lying position, changing position in bed.
10. Food consumption with range definition: the degree of independence in food and liquid consumption, including food consumption using nosogastral tube or total parenteral nutrition.

Evaluation of the degree of independence in P-ADLs:

- 0 points - independent (never requires help, preparing things or supervision)
- 1 point - independent – help required only in preparing for activity (preparation or placing things in grasp range, with no need for supervision or physical help)
- 2 points – supervision (supervision, giving tips)
- 3 points - help in the restricted range (patient is self-reliant in moving limbs or needs help, but with no use of strength)
- 4 points - help in a wide range (physical help requiring strength usage, including limb lifting offered by one person, whilst patient is performing half or more tasks that constitute particular activity
- 5 points - help in the maximum range (physical help requiring strength usage (including limb lifting) offered by two or more people or physical help requiring strength usage in performing more than half tasks that constitute particular activity)
- 6 points - total dependence (activities were always carried out by other people)
- 7 points - total dependence (no activity was performed).

Interviewers

Interviewers were chosen among the nurses taking care of patients in long-term in-home care nursing. Before commencing the study, they took part in a training to become familiar with the aims of the study, questioning system, descriptors and ways of registering answers. The same interviewers evaluated patients twice: upon admission to long-term in-home care nursing and after 90 days of care. activities of the patient twice at the admission (on 3 consecutive occasions) and after 90 days (on 3 consecutive occasions).

All observers were encouraged to contact the researchers in case of doubts or when requiring additional explanation. Principles of determining scores (descriptions of possible answers) are very precise in the Inter-RAI-HC questionnaire and usually equivocal.

Statistical analyses

Scores of independence in performing P-ADLs were described with mean and standard deviation. Normal distribution had variables $p \geq 0.05$. Statistical significance of these differences between

3 age subgroups was estimated with Kruskal-Wallis test. Changes in proportions of qualitative variables (percentages of patients with total dependence) upon admission (initial examination) and after 90 days of follow-up (periodic examination) were compared with McNemar test. Wilcoxon signed-rank test was used to compare mean scores of independence in P-ADL in the initial and periodic examinations. Both per-protocol and intention-to-treat analyses were performed.

Assuming 60% of individuals with total dependence at admission and decrease to 45% after 90 days the sample size was calculated at 67 patients with power of the study equal 80% and alpha error 0.05.

All statistics hypotheses were verified at the level of significance $p<0.05$. The calculations were carried out with Statistica 8.0 statistical software (StatSoft).

Ethical Considerations

The study protocol was approved by Ethical Committee at the Medical University in Bialystok (decision no. R-I-002/222/2009). All participants or their legal caregivers gave their written informed consent to participation in the study. They were informed that they could at withdraw from the study any time.

RESULTS

Participants' (N=100) age varied across the sample with the majority (85%) being in the group of 65 years and above. Females predominated (66%). The structure of age, gender and ADL-hierarchy of all the respondents taking part in the initial examination are shown in Table 1.

Table 1. Age, gender and ADL hierarchy of the study patients (N=100)

	Study patients N=100
Age structure (in years)	
<65	15
65-79	28
≥80	57
Gender structure	
Male	34
Female	66
Mean age in years: mean (±SD) 78.1 (±11.9)	
ADL hierarchy	
Independent	0
Supervision	0
Limited assistance	7
Extensive assistance I	4
Extensive assistance I	21
Dependant	38
Total dependance	30
Mean ADL hierarchy value mean (±SD) 4.8 (± 1.13**)**	

The analysis of total dependence in P-ADLs showed that more than 50% of patients were entirely dependent in 8 out of 10 specified P-ADLs (except mobility in bed and food consumption). The highest percentages (74%) were not able to take a bath independently; fewer patients were entirely dependent in food consumption (32%).

The mean value of independence evaluations (N=100) in 10 P-ADLs ranged from 4.09 (±1.68) to 5.91 (±1.09). Food consumption and mobility in bed obtained lower mean, respectively 4.09 (±1.68) and 4.44 (±1.49) From the comparative analysis of the P-ADLs activities in the initial and periodic examination (N=83 per protocol analysis) it can be concluded that total dependence did not change in any of the 10 analyzed activities of daily living. And when intention to treat analysis was performed (N=100) percentages of patients totally dependent in performing eating and mobility in bed increased significantly (32% versus 53% and 37% versus 48% at the initial and periodic assessment respectively) (Table 2). Also, comparison of the mean value of independence for analyzed activities has not changed significantly over 90 days, with the only exception being the mean value of independence for dressing up the upper part of the body which significantly improved after 90 days (N=83 per protocol analysis) (p=0.009) (Table 3).

The mean value of independence evaluations in specified P-ADLs did not show significant differences depending on the age group (Data are not shown). High mortality rate is noted among these patients (15% during 90-days follow-up).

Table 2. Patients entirely dependent in performing physical activities of daily living (P-ADL) in initial and periodic examination

P- ADL	**Intention to treat analysis**			**Per protocol analysis**		
	Initial examination N=100(%)	**Periodic examination**		**Initial examination N=83(%)**	**Periodic examination**	
Bathing	74(%)	79(%)	p= 0.227	59(71.1)	62(74.7)	p=0.508
Personal hygiene	61(%)	68(%)	p= 0.791	48(57.8)	51(61.0)	p= 0.754
Dressing up upper body parts	58(%)	59(%)	p= 1.000	47(56.6)	42(50.6)	p=0.180
Dressing up lower body parts	66(%)	69(%)	p= 0.607	54(65.1)	52(62.7)	p=0.754
Walking	55(%)	56(%)	p=1.000	43(51.8)	39(47.0)	p=0.289
Moving	63(%)	65(%)	p= 0.754	50(60.2)	48(57.3)	p=0.687
Occupying and vacating the toilet seat	56(%)	59(%)	p= 0.267	45(54.2)	44(53.0)	p=1.000
Using a toilet	57(%)	58(%)	p=1.000	44(53.0)	41(49.4)	p=0.453
Mobility in bed	37(%)	48(%)	**p= 0.001**	30(36.1)	31(37.3)	p=1.000
Food consumption	32(%)	53(%)	**p=0.001**	25(30.1)	26(31.3)	p=1.000

Where: $p<0.05$ – statistics significance; The McNemar test was used to compare related values (in subsequent evaluations).

Table 3. Mean values of independence evaluations in performing physical activities of daily living (P-ADL) in the initial (N=83) and periodic examination (N=83)

P- ADL	Initial examination		Periodic examination		
	Mean	SD±	Mean	SD±	
Bathing	5.84	(1.12)	5.77	(1.21)	p=0.301
Personal hygiene	5.12	(1.48)	5.00	(1.58)	p=0.294
Dressing up upper body parts	5.05	(1.52)	4.83	(1.55)	**p=0.009**
Dressing up lower body parts	5.42	(1.22)	5.31	(1.06)	p=0.213
Walking	5.42	(1.86)	5.27	(1.90)	p=0.173
Moving	5.77	(2.01)	5.65	(2.07)	p= 0.355
Occupying and vacating the toilet sea	5.35	(1.80)	5.27	(1.89)	p= 0.509
Using toilet	5.25	(1.61)	5.07	(1.70)	p=0.061
Mobility in bed	4.40	(1.52)	4.30	(1.61)	p=0.112
Food consumption	4.01	(1.70)	3.96	(1.79)	p=0.371

Where: $p<0.05$ – statistical significance; The Wilcoxon signed-rank test was used to compare related values.

DISCUSSION

Deficits in self-care seen in patients P-ADLs were an important problem. The level of functional efficiency measured with ADL tests determined the degree of difficulty or total inability to perform independently P-ADLs and therefore, set the scope of need for home care nursing and social home services. As it arises from our study, the percentage of the participants entirely dependent in 10 P-ADLs ranged between 32% for food consumption to 74% for bathing. Overall in 8 out of 10 P-ADLs (all except food consumption and mobility in bed) more than 50% of the respondents were entirely dependent. Other researchers conducted using InterRAI questionnaire among patients under home care from Canada and United States showed that the percentages of patients entirely dependent on other people's help (ADL hierarchy) were considerably lower than in our own research (30% versus 1% in Ontario and 4.5% in Michigan) [6]. On the other hand mean value of ADL hierarchy in our study (4.8) was comparable to value obtained in Italian patient eligible for new home care integrated services. Our own research shows that mean evaluation values of independence degree in P-ADLs using home care nursing were much higher (4.01 -5.84range) than those shown among home care patients in Nordic countries (1.9 – 3.8) except mobility in bed and food consumption (4.40-4.01 respectively) than those shown in Italian research (4.7) and [8,9].Less percentage of total dependents we found among patients with food consumption impaired (32%) and mobility in bed impaired (37%). The differences statistically significant were in intention to treat analysis (p=0.001) what means that were no success in improved entirely dependent in performing these physical functioning issues in initial and periodic examination. Statistically significant were in mean values of independence evaluations P-ADLs in the initial and periodic examination involve dressing up upper body parts (p=0.009). Ability to move is a very important aspect of physical functioning, which is related to mobility manifesting itself by upper and lower body efficiency. Efficiency of the upper body part depends on shoulder and forearm range as well as hand grasp and grip capacity [10,11]. Patients are able to regain upper body part manual activities earlier than activities related to walk [12].

So far, in Poland is the very restrictive system of qualifying patients to long-term home-care nursing (0-40 points in the Barthel scale). Only people with significant deficits in self-care regarding P-ADLs are eligible for long-term home-care nursing. Patients who use long-term home care nursing are endangered with death and health deterioration. High mortality rate is noted among these patients (15% during 90 days follow-up). This probably resulted from the restrictive qualification criteria used in Poland for such form of in-home healthcare service of patients. This probably resulted from the restrictive qualification criteria used in Poland for such form of in-home healthcare service of patients. Perhaps changes in the qualifying criteria enabling more independent patients' access to such form of care would allow obtaining improved effects of care. As the scenarios changed to being totally dependent on care they need 24-hours institutional's care i.e in nursing homes. In Sweden, medical healthcare seems more accessible to those who live at home are younger, less dependent and who have access to informal care [13]. In this study right up to 15% of the examined our patients died during 90 days (1 decade) upon admission. In Nordic country (Denmark, Iceland, Norway, Sweden) aged of assessed patients receiving home care was 65 years and over and after 12 months died 17% in Oslo, 23% in Stockholm, 10% Copenhagen, and 6% in Reykjavik [10].

CONCLUSIONS

The majority of patients who are under long-term in-home care nursing in Poland are entirely dependent in physical activities of daily living.

No significant improvement concerning independent performance of physical activities of daily living (except dressing up upper body part) was noted after 90 days of long-term in-home care nursing.

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Conflicts of interest

None declared.

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