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Functional assessment of geriatric in patients admitted in acute and planned setting

Ocena stanu funkcjonalnego pacjentów geriatrycznych hospitalizowanych w trybie pilnym i planowym

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Abstract

Introduction and objectives. *Hospital admission is an important risk factor for the functional decline in older adults. The aim of the present study was to evaluate the functional status in geriatric patients admitted to the department of internal medicine in the acute and planned setting.* **Material and methods.** *The study included 359 consecutive patients aged ≥60 years, with Vulnerable Elders Survey (VES-13) score ≥3, hospitalized in the Department of Internal Medicine and Cardiology, Medical University of Warsaw. The evaluation of functional status was performed after an initial medical treatment. Standardized functional assessment scales were used, including Activities of Daily Living (ADL), Instrumental Activities of Daily Living (IADL) and short Tinetti scales. The results were analyzed retrospectively in terms of patients' age and type of hospitalization (acute vs. planned setting).* **Results.** *Patients' mean age was 79 (±8) years (range: 60-98), 59% were female and 51% of the patients were 80 years or older. The patients with good functional performance comprised 62.12% (score 5-6 in ADL) as compared to 25.07% subjects with severe functional impairment (score 2 or less in ADL). Significant differences in the ADL, IADL and Tinetti scores among patients admitted in the acute and planned setting, as well as in different age groups were observed.* **Conclusions**. *Poor functional status is a common sociomedical problem observed among the elderly patients, especially those hospitalized for acute illness. Incorporating the functional assessment into general medical examination in internal medicine wards could facilitate development of optimal treatment strategies and addressing patients' disabilities. Planned hospitalizations of older adults may reduce incidence of acute hospital admissions related to the risk of functional decline. (Gerontol Pol 2022; 30; 79-88) doi: 10.53139/GP.20223006*

Keywords: functional performance, comprehensive geriatric assessment, hospitalization, older adults

Streszczenie

Wstęp i cel. *Czynnikami ryzyka pogorszenia stanu funkcjonalnego osób starszych jest wiek i hospitalizacja. Celem pracy była ocena stanu czynnościowego pacjentów geriatrycznych hospitalizowanych w oddziale wewnętrznym w zależności od wieku i trybu hospitalizacji.* **Materiał i metody.** B*adanie przeprowadzono w grupie 359 pacjentów w wieku ≥ 60 lat, którzy uzyskali ≥3 punktów w skali Vulnerable Elders Survey (VES-13), kolejno przyjmowanych do Kliniki Chorób Wewnętrznych i Kardiologii Warszawskiego Uniwersytetu Medycznego. Ocena stanu funkcjonalnego została przeprowadzona przed wypisem pacjenta, za pomocą skali podstawowych czynności życia codziennego (ADL), złożonych czynności życia codziennego (IADL) oraz skróconej wersji skali Tinetti. Wyniki przeanalizowano retrospektywnie w zależności od wieku badanych oraz trybu przyjęcia (pilny vs planowy).* **Wyniki.** *Średni wiek badanych wynosił 79 (± 8) lat (zakres: 60–98), 59% stanowiły kobiety, 51% osoby w wieku 80 lat lub więcej. Pacjenci sprawni w zakresie ADL stanowili 62,12% (5-6 punktów), a poważnie niesprawni 25,07% ogółu badanych (2 lub mniej punktów). Zaobserwowano znaczące różnice w wynikach ADL, IADL i Tinetti wśród pacjentów przyjętych w warunkach ostrych w porównaniu do osób przyjmowanych planowo, a także w różnych grupach wiekowych.* **Wnioski.** *Pogorszenie stanu funkcjonalnego jest częstym problemem socjomedycznym u pacjentów w zaawansowanym wieku zwłaszcza hospitalizowanych w trybie pilnym. Włączenie oceny stanu funk-*

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cjonalnego do badania lekarskiego na oddziałach internistycznych mogłoby ułatwić dobór optymalnych strategii leczenia oraz radzenia sobie z niepełnosprawnością chorych. W populacji osób starszych istotne znaczenie mają hospitalizacje planowe celem zmniejszenia ryzyka hospitalizacji nagłych, które są związane z ryzykiem pogorszenia stanu funkcjonalnego. (Gerontol Pol 2022; 30; 79-88) doi: 10.53139/GP.20223006

Słowa kluczowe: stan funkcjonalny, całościowa ocena geriatryczna, hospitalizacja, starsi dorośli

Introduction

Aging of societies, increasing prevalence of chronic diseases as well as rising incidence of acute disorders constitute the reason for elderly patients to be a dominant group in many hospital departments. Compared to younger patients, older adults are more often admitted to hospitals with severe clinical conditions, stay longer, require more diagnostic tests and experience higher rates of adverse health outcomes after discharge [1].

According to Central Statistical Office (CSO, Polish GUS) data, in 2050 the number of Poles aged 65 and older will constitute almost one third of the population and will increase by 5.4 million in relation to year 2013 [2]. Such a demographic trend makes it necessary to focus on the health problems of older adults, and requires solid evaluation, risk stratification and developing action plans. These needs are met by a geriatric approach. A mandatory rule in geriatrics is to evaluate how the symptoms and diseases affect the functional and mental status of the patient and to assess the risk of geriatric syndromes. The functional status can be defined as the ability to perform typical daily life tasks, safely and independently and without excessive effort. It is one of the major determinants of the overall health condition as well as a valuable indicator of the quality of life of older adults. There are many risk factors of functional decline [3]. The best known include: low level of physical activity [4,5], muscle mass and strength reduction [6,7], increased and decreased body mass index, low frequency of social contacts [3], cognitive impairment and depression [8], multimorbidity [4,9], visual and hearing impairment [10], falls and injuries [11,12]. It is also a well-known fact that older adults admitted to a hospital, especially for acute health problems are at risk of a functional decline during hospitalization and after discharge [13]. Some studies show that even one third of older adults lose their ability to perform everyday activities during hospitalization [14]. Evaluation of the functional status is an inherent part of a comprehensive geriatric assessment (CGA). The CGA is a multidisciplinary diagnostic and treatment process which identifies medical, psychosocial, and functional limitations of an elderly person, as well as indicates the patient's strengths. The CGA is useful in identifying individuals who are at a high risk of functional decline. It could enable an early intervention, an adequate individualized treatment plan, better allocation of resources and a reduction of the period of dependence near the end of life. Shortening disability period and extending the Healthy Life Years (HLY) is a current goal of health and social policies of European countries. Data on intervention programs show that participants with a good functional status or moderate frailty tend to benefit the CGA the most [15].

Objectives

The aim of the present study was to evaluate the functional status in geriatric patients with increased vulnerability to health deterioration admitted to the Department of Internal Medicine and Cardiology in terms of age and type of hospitalization: acute vs. elective setting.

Material and methods

We prospectively evaluated the functional status of 359 consecutive patients who underwent a comprehensive geriatric assessment (CGA) at the Department of Internal Medicine and Cardiology, Medical University of Warsaw. The inclusion criteria were: age 60 or more and Vulnerable Elders Survey (VES-13) score ≥3 (table I).

VES-13 is a questionnaire containing 13 questions, including age, self-rated health, limitations in physical functions, and functional disabilities. It is a simple tool used to identify a group of older adults with increased vulnerability. In total, the examined person can obtain a score of 0–10, the higher the score, the higher the risk of occurrence of geriatric problems [16]. In Poland, the National Health Fund (NFZ) finances CGA informed that the VES-13 score was ≥3 [17,18]. To assess the functional status the Activities of Daily Living (ADL) and Instrumental Activities of Daily Living (IADL) scales were used. A simplified version of Tinetti test was performed to evaluate mobility and fall risk. The evaluation of the functional status was performed after an initial treatment of the underlying disease related to hospital admission. The ADL, which was originally proposed in the 1960s by an American physician Sidney Katz, is a simple scale which includes the fundamental skills needed to manage one's basic physical needs [19,20]. The ADL

Table I. The Vulnerable Elders Surve3y-13 (VES-13) scale

Domain		score
Age	60-74	0
	75-84	1
	85+	3
Self-rated health	Good, very good, excellent	0
	Fair, poor	1
Difficulty in activities (if ≥ 2 positive -> 2 score points, if 1 -> 1 score point)	Kneeling, bending, crouching	yes/no
	Lifting and carrying more than 4,5 kg	yes/no
	Reaching out and lifting upper extremities above shoulders	yes/no
	Writing or handling small objects	yes/no
	Walking around 400 metres	yes/no
	Performance of hard housework (like windows or floor cleaning)	yes/no
Needs assistance with (if ≥ 1 positive -> 4 score points)	Shopping	yes/no
	Money management	yes/no
	Crossing the room (also with the help of a cane or walker)	yes/no
	Light housework	yes/no
	Bathing or showering	yes/no
	Total (max. 10 score points)	

[Based on: Saliba S., Elliott M., Rubenstein L.A. et al. The Vulnerable Elders Survey: A Tool for Identifying Vulnerable Elders in the Community. J. Am. Ger. Soc. 2001; 49: 1691–1699.]

Table II. Patients' characteristics in terms of planned and acute hospitalization

Hospitalization	Planned	Acute	All
All, n (%)	148 (41.23)	211 (58.77)	359 (100)
Age:			
60-79 years	95 (64.19)	80 (37.92)	175 (48.75)
≥ 80 years	53 (35.81)	131 (62.09)	184 (51.25)
mean ± SD	77 ± 7	81 ± 8	79 ± 8
Female sex, p=0,176	94 (63.51)	119 (56.40)	213 (59.33)
Household living situation:			
alone	49 (33.11)	76 (36.02)	125 (34.82)
with family	98 (66.22)	122 (57.82)	220 (61.28)
with caregiver	1 (0.67)	13 (6.16)	14 (3.90)
The discharge diagnosis cause (ICD-10):			
infectious diseases (A00-B99)	2 (1.35)	15 (7.11)	17 (4.74)
cancer (C00-D48)	1 (0.68)	11 (5.21)	12 (3.34)
hematological (D50-D89)	2 (1.35)	11 (5.21)	13 (3.62)
metabolic (E00-E90)	8 (5.41)	8 (3.79)	16 (4.46)
cardiovascular (I00-I99)	131 (88.51)	116 (54.98)	247 (68.80)
respiratory (J00-J99)	1 (0.68)	33 (15.64)	34 (9.47)
gastrointestinal (K00-K93)	0	1 (0.47)	1 (0.28)
urinary (N00-N99)	0	13 (6.16)	13 (3.62)
other	3 (2.03)	3 (1.42)	6 (1.67)
Number of comorbidities			
0-5	69 (46.62)	53 (25.12)	122 (33.98)
>5	79 (53.38)	158 (74.88)	237 (66.02)
Hospitalization time (days), median (IQR)	3 (3.0-4.0)	9 (7.0-14.0)	6 (4.0-11.0)

ICD – International Statistical Classification of Diseases and Related Health Problems; IQR – interquartile range; SD – standard deviation

comprises six following areas: 1. bathing, 2. dressing, 3. toilet hygiene (getting to the toilet, cleaning oneself), 4. transferring (the ability to walk, get in and out of bed), 5. continence and 6. eating. For each area a patient can receive one point. In our study ADL results were divided into three categories: independent (score 5-6), partially dependent (score 3-4) and dependent (score 0-2). The Lawton and Brody's IADL scale [21], includes more complex activities related to independent living in the community. We used an eight-point version of the scale, which includes: telephone use, shopping, preparing food, housekeeping, doing laundry, using public transportation, handling own finances and medications. Responses to each item range from independent (1 score point) to dependent (0 score points). IADL results were divided into three categories: high functional performance (score 7-8), moderate functional disturbance (score 2-6) and low functional performance (score 0-1). The last tool we used was the simplified version of the Tinetti Test, a common clinical tool for assessing person's static and dynamic balance abilities and mobility. The maximum score, indicating good mobility, was 10. The results were divided into three categories: independent walking, walking with assistance and bed-ridden for 10, 1-9 and 0 score points, respectively.

The patients' socio-demographic and general medical data was collected as well (table II). The results were analyzed retrospectively in terms of patients' age and admission mode (planned diagnostic vs. acute - through--emergency department).

Data was presented using descriptive statistics parameters. To show differences in the distribution of categorical variables in the study groups, the $\chi 2$ test was used. The p value lower than 0.05 was regarded as statistically significant difference. Statistical analysis was performed using the Statistica software (STATISTICA version 13; Statsoft Inc).

This study was a part of the statutory work of the Department of Geriatrics, Medical University of Warsaw and was approved by the Local Bioethics Committee (protocol number: AKBE/116/2020).

Results

Most of hospitalized patients were admitted in acute setting (59 vs. 41 %, figure 1).

The mean age was 79 (±8) years (range: 60-98). 59% were female. Most subjects admitted in planned setting were 60-79 years old (64 %), while in the acute admission group patients aged 80 years or more dominated (62 %). The majority of the participants suffered from multimorbidities. 66% of the patients were diagnosed with more than five chronic comorbid diseases (table 2). Most admissions were due to cardiovascular causes (69%). Median hospitalization time was 6 days (IQR 4.0-11.0; range: 1-42 days). Of the 359 patients, 12 died, yielding an in-hospital mortality rate of 3.3%. All deaths were observed in the acute admissions group. The leading cause of death was sepsis followed by cancer with complications and cardiovascular causes (6, 4 and 2 subjects, respectively).

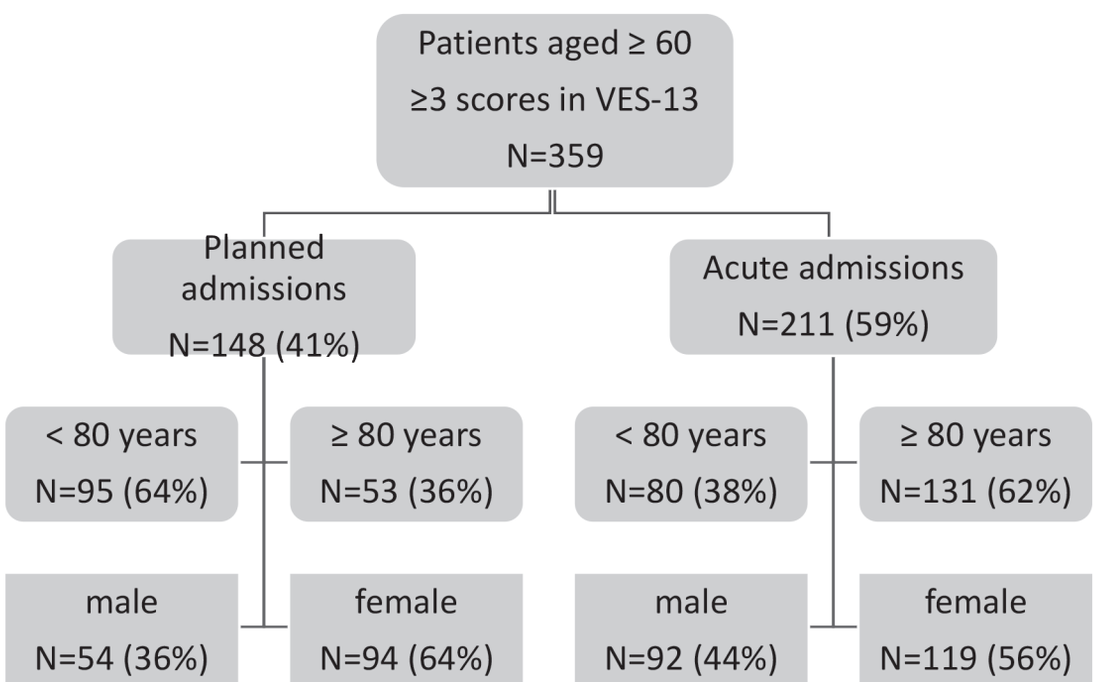

Figure 1. Study group

The percentage of patients with good functional performance was 62% (scores 5-6 in ADL), with severe functional impairment - 25% (scores 2 or less). 28.41% were dependent in instrumental activities of daily living (scores 0-2 in IADL). Significant differences in ADL, as well as in IADL and Tinetti scores among patients admitted in acute and planned setting were observed (figure 2).

Planned patients showed better scores in all analyzed scales. They suffered from more than 5 comorbidities less frequently (53.38% vs. 74.88%) and had a shorter hospital stay (3 vs. 9 days; Table II). Only 43.60% of acute patients were assessed as fully functional in ADL scale before the discharge. 23.70% were independent in instrumental activities of daily living and 29.47% had no problem with mobility. 36.02% subjects in the acute group admitted that they lived alone.

Next, the functional status in different age groups was analyzed: 49% were 60-79 years old, 51% were 80 years or more. The characteristics of these two subgroups are shown in table III.

Older patients were characterized by poorer functional status and worse mobility. They received significantly lower scores in ADL, IADL and the simplified version of the Tinetti test ($p < 0.001$, figure 3). 35.33% subjects aged 80 or more lived alone. There were no significant differences between men and women in the analyzed scales.

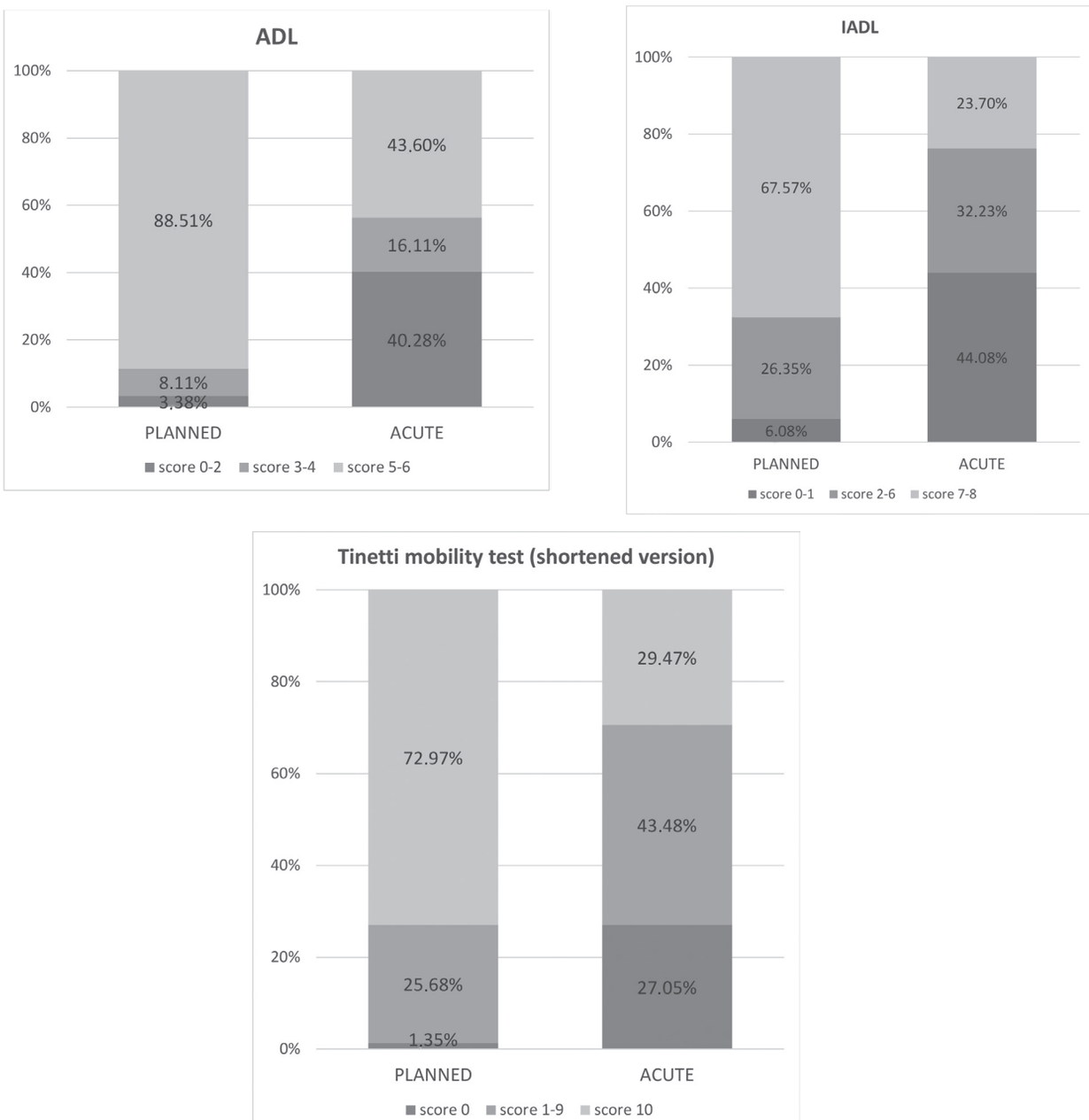

Figure 2. Functional status in terms of planned and acute hospitalization

Table III. Patients' characteristics in terms of age

Age	60-79 years	≥ 80 years
Hospitalization, n (%)		
planned	95 (54.29)	53 (28.80)
acute	80 (45.71)	131 (71.20)
Female sex, p=0,266	109 (62.29)	104 (56.52)
Household living situation:		
alone	60 (34.29)	65 (35.33)
with family	112 (64.00)	108 (58.69)
with caregiver	3 (1.71)	11 (5.98)
Number of comorbidities		
0-5	69 (39.43)	53 (28.80)
>5	106 (60.57)	131 (71.20)
Hospitalization time (days), median (IQR)	4 (3.0-9.0)	7 (4.0-12.0)

IQR – interquartile range

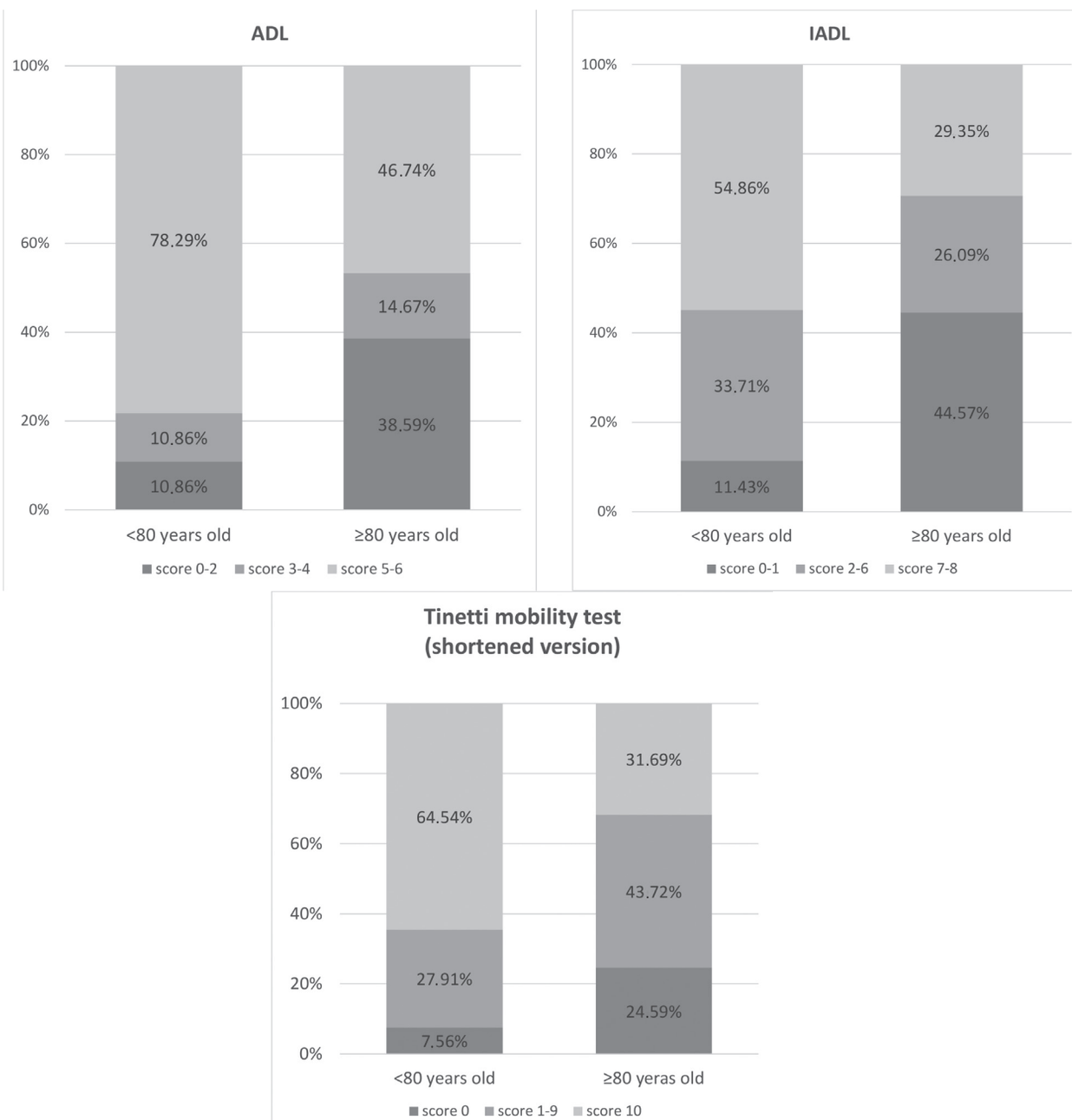

Figure 3. Functional status in terms of age

Discussion

In recent decades, the understanding of geriatric patients' functioning has been revised. Currently, the patient-centered view is accepted more often than the traditional disease-centered view. Unfortunately, according to some authors, this progress is more pronounced in medical publications than in common practice. In the everyday life, interventions are focused rather on relieving symptoms, and comprehensive approach is unfortunately still rare [22]. The patient-centered approach requires the involvement of various health professionals, as well as patients and their families. Comprehensive assessment requires focusing not only on the symptoms of the disease but also on functional, psychological, social and environmental status of a geriatric patient.

Progressive functional decline is a common condition in older adults, which leads to an increase in demand for the medical, nursing and care services as well as the dependence on others. It reduces the quality of life and is responsible for increasing health care expenses. The loss of independence in performing activities of daily living is associated with the frailty syndrome [23], increased risk of falls [24] and higher mortality [25]. Early identification of patients who are at the greatest risk of functional decline could enable a more adequate treatment plan and better allocation of resources. Moreover, it prepares patients and their families for the subsequent difficulties. Le Courvoisier et al. analyzed data of 555 patients aged ≥75 years admitted to the emergency department for acute decompensated heart failure (ADHF) [26]. Functional impairment was associated with a worse short-term prognosis in this population. Authors of the study believe that functional status should be assessed at admission in all elderly ADHF patients to help identify those at greatest risk, with the goal of improving the clinical management, preventing further functional loss and scheduling appropriate rehabilitation therapy.

In the present study, the percentage of fully functional patients assessed by the ADL scale was 62%. These findings are similar to other reported in the literature. Wysokiński et al. [27] investigated the cohort of 150 patients aged over 65 (mean 78 ± 7.89 years) hospitalized in four internal medicine departments, mostly also for cardiovascular causes. The percentage of fully functional patients (scores 5-6 in ADL) was 59.33%. It needs to be highlighted that the results we obtained differ significantly depending on the admission mode. 88.51% planned patients were assessed as independent compared to only 43.60% in the acute admission group. Good functional status observed in older adults admitted for planned diagnostic procedures was consistent with the results of the nationwide PolSenior study [28] and the survey conducted by Bogowolska-Wespięć et al. in Silesia region [29], where more than 90% of the respondents living at home performed their everyday activities without the need for help of others. Similar results were reported by Płaszewska-Żywko et al. [30], who evaluated 102 residents of the elderly homes aged 65 or more (mean 76.2 years) without serious chronic diseases. 89% were independent in ADL. In the present study, more than half of the subjects in the acute admission group was partially or totally dependent in self-care (ADL) after implementation of an initial treatment. Moreover, almost 4/5 required help in two or more instrumental activities of daily living. These patients are at high risk of further functional decline and special attention should be given when planning their discharge and further ambulatory or institutional care. Prognostic significance of ADL or IADL disability was confirmed by Balzi et al. [31]. In her study, participants with worse functional status at the baseline had greater worsening in ADL and IADL disability over 3 years of follow-up. Other independent risk factors were: lower level of physical activity, higher energy intake and hypertension. However, authors emphasized that in the studied population, overeating and obesity may have been more important problems than caloric malnutrition.

The gradual loss of functional performance among older adults usually progresses in a certain order. It starts with difficulties in instrumental activities, such as housekeeping, bill payments or medication use, and then affects basic self-care activities. Fieo et al. in a systematic review [32] show that the ADL scale may have lower sensitivity in detecting changes in patients with early disability. The results of our study confirm this thesis. Subjects with IADL difficulties outnumbered those with ADL-only disabilities.

As mentioned before, functional decline is associated with many adverse outcomes, one of which is an increased risk of falls. Falls may occur at any age, however, in elderly people with greater vulnerability, result in increased morbidity, mortality and high costs of treatment. According to the study by Tinetti et al. [33], falls are a strong predictor of placement in a nursing home. The risk of such an admission is three times greater for a noninjurious fall and ten times greater for at least one fall causing serious injury. Institutionalization always involves financial costs and a loss of patient autonomy. In the PolSenior study [34], falls most often occurred while walking, only 5% was related to potentially dangerous activities. Therefore, the evaluation of fall risk should be an integral part of clinical examination of older adults. In our study, gait or balance disorders were observed in

70% of acute and 25% of planned patients. These numbers demonstrate the high prevalence of fall risk in the studied population and the need to implement preventive strategies.

In the present study, worse functional status and impaired mobility were associated with age but not sex. However, in some studies the difference between sexes has been observed. In PolSenior women aged 85 and over were less fit on the ADL scale than men of the same age [28]. Similar observations were described by Raczkiewicz et al. [35]. Age is a common factor in other studies reported in the literature [27, 28, 36, 37]. According to Hébert et al. [36], in a population of people aged 75 years and more, the odds of functional decline double for every 5-year increase in age. However, it should be emphasized that age as an independent factor rarely becomes a cause of disability. Other factors, such as multimorbidities or unfavorable lifestyle play an important role. The studied population was characterized by high multimorbidity rate. Cardiovascular diseases were the most common cause of hospitalization. They have proved to be an important factor in the development of disability in older adults in PRO.V.A. study [38]. Moreover, the presence of cardiovascular diseases was a risk factor for ADL and IADL disabilities in the study by Wang et al. [4].

As mentioned before, evaluation of the functional status and mobility is an inherent part of CGA. The geriatric approach considers the need for planned hospitalizations even in the oldest age groups in order to diagnose geriatric problems and optimize treatment strategies. Planned hospital admission allows appropriate amount of time to assess each patient and enable prioritization of complex needs of the elderly. We believe it could prevent or delay functional decline, diminish its consequences as well as reduce the number of future acute readmissions. However, bearing in mind these benefits, we must be aware of the hazards of hospitalization of the elderly patients. For some vulnerable older adults, even a planned hospitalization may result in functional decline. An unfamiliar environment, sensory deprivation, immobilization, high beds with rails are some of the well-known factors that contribute to the cascade of dependency. The risk of planned hospitalization can be reduced by proper selection of patients, modification of the usual acute hospital environment and the interdisciplinary care of health professionals.

A limitation to this study is that we reported a single center experience and our findings potentially have limited generalizability. In addition, the CGA was conducted only once - before the discharge, after an initial treatment. We did not assess the functional status on admission. Therefore, we cannot present data on how hospitalization itself affects the functional status. Neither did we assess the long-term effects of using CGA in the hospitalized elderly patients.

The elderly population is heterogeneous and diverse. The strength of our study is that we collect data and conduct the CGA only in patients with the increased vulnerability (assessed by VES-13 scale). This group may benefit most from a preventive approach based on such a procedure.

The work on our publication coincided with the COVID-19 pandemic caused by the SARS-CoV-2 coronavirus, which has dramatically affected European countries. The most frequently recorded deaths concern elderly people with significant comorbidities. At the same time, the media more and more often cite numerous examples of the victorious defeat of the virus by people of advanced age. The current pandemic highlights the health inequalities of the elderly and the different chances of survival determined not only by genetics and health, but also by the functional status, environmental, economic and social factors. According to the authors, the experience gained during COVID-19 pandemic may allow the development of new strategies aimed at successful aging.

Conclusions

Poor functional status and mobility decline are common sociomedical problems observed among elderly patients, especially those hospitalized for acute reasons. Functional dependence increases with the progress of the aging process. Incorporating the functional assessment to general medical examination in internal medicine wards could help in determining treatment strategies and better cope with patients' disabilities. Planned hospitalizations of older adults may reduce incidence of acute hospital admissions related to the risk of functional decline.

Conflict of interest
None

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