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The Impact of Multimorbidity on the Functional Skills in Elderly People

Wpływ wielochorobowości na sprawność funkcjonalną osób starszych

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Abstract

Introduction. Multimorbidity is defined as the occurrence of two or more chronic diseases and is the most noticeable feature of an elderly person. With age, an increase in the incidence of chronic diseases is observed. Somatic diseases frequently co-occur with mental illnesses. In most cases, chronic diseases result in seniors' disability. The most common ones include cardiovascular system, locomotor system, sight and hearing disorders; neurological and mental diseases; and mental impairments.
Aim. The aim of the paper was to assess the prevalence of multimorbidity in elderly people in their home environment and to determine the relationship between multimorbidity and seniors' functional skills.
Material and Methods. The method of a diagnostic survey was applied, with the direct questionnaire technique. A questionnaire of the authors' own construction was used, as well as standardized tools, i.e. the Barthel and the Lawton scales. The study involved 504 people aged 66–94 years staying in their home environment.
Results. Only 0.05% of the subjects did not report any disease. The average number of diseases was 2.98 (3.03 in women, 2.90 in men). A statistically significant correlation was found between the number of the declared diseases and the patients' age ($p<0.001$). In addition, together with an increase in the number of diseases, a deterioration was observed in the results on the Barthel and Lawton scales ($p<0.001$), as well as in cognitive and emotional skills ($p<0.001$).
Conclusions. The vast majority of people aged over 65 years living in rural areas experienced multimorbidity; the following predominated among the diseases: hypertension, osteoarthritis, circulatory insufficiency, atherosclerosis, and diabetes mellitus. Together with an increase in the number of diseases, a deterioration was observed in the patients' functional, cognitive, and emotional skills. **(JNNN 2024;13(1):17–22)**
Key Words: elderly people, home environment, multimorbidity

Streszczenie

Wstęp. Wielochorobowość (polipatologia) definiowana jest jako występowanie dwóch lub więcej chorób przewlekłych i jest najbardziej widoczną cechą starszego człowieka.
Cel. Celem pracy była ocena występowania wielochorobowości u osób w podeszłym wieku w środowisku domowym oraz określenie zależności pomiędzy wielochorobowością a sprawnością funkcjonalną i psychiczną osób w starszym wieku.
Materiał i metody. Badania przeprowadzono metodą sondażu diagnostycznego, posłużono się techniką wywiadu bezpośredniego. Wykorzystano kwestionariusz wywiadu własnej konstrukcji oraz wystandaryzowane narzędzia tj.: Skrócony Test Sprawności Umysłowej (AMTS), Skala Barthel i Skala Lawtona. Badaniami objęto 504 osoby w wieku od 66 do 94 lat w środowisku domowym.
Wyniki. Zaledwie 1,98% badanych osób nie deklarowało występowania żadnej choroby. Średnia liczba chorób wynosiła 2,98 (u kobiet — 3,03, a u mężczyzn — 2,90). Stwierdzono istotną statystycznie zależność pomiędzy ilością deklarowanych chorób a wiekiem badanych ($p<0,001$). Ponadto zauważono, że wraz ze wzrostem u badanych liczby jednostek chorobowych pogarszały się ich wyniki na skali Barthel i Lawtona ($p<0,001$) oraz sprawność poznawcza i emocjonalna ($p<0,001$).

Wnioski. Osoby po 65. roku życia mieszkające na wsi w zdecydowanej większości doświadczały wielochorobowości, a wśród chorób dominowały: nadciśnienie tętnicze, choroba zwyrodnieniowa stawów, niewydolność krążenia, miażdżyca i cukrzyca. Wraz ze zwiększaniem się liczby jednostek chorobowych pogarszała się sprawność czynnościowa, poznawcza i emocjonalna badanych osób. **(PNN 2024;13(1):17–22)**

Słowa kluczowe: osoby w podeszłym wieku, środowisko domowe, wielochorobowość

Introduction

Multimorbidity is defined by the World Health Organization as the occurrence of two or more chronic diseases and is often the most noticeable feature of an elderly person [1,2].

With age, an increase in the incidence of chronic diseases is observed. In the population of 60-year-olds, about 73% experience at least one chronic disease, while among those after 70 years of age, chronic diseases already affect more than 84% of the population [3]. As reported by Statistics Poland, about 4 chronic diseases co-occur in people aged over 60 years. Also, somatic diseases frequently appear simultaneously with mental illnesses [4].

In most cases (about 85%), chronic diseases result in elderly people's disability. The most common ones include cardiovascular system, locomotor system, sight and hearing disorders; neurological and mental diseases; and mental impairments [5].

A serious consequence of multimorbidity is polypharmacy. It denotes simultaneous daily intake of at least 5 therapeutic agents. Among elderly people, there are also cases of severe polypharmacy, when at least 10 drugs are prescribed to a patient for everyday intake. These may include medications that do not need to be administered. Polypharmacy concerns about 50% of seniors, and severe polypharmacy refers to about 10% of this population. Multimorbidity influences the development of polypharmacy; in turn, the use of more drugs increases multimorbidity [6,7].

It is maintained that every senior with multimorbidity should undergo a functional status assessment, including an evaluation of physical, mental, and functional skills [8].

The aim of the paper was to assess the prevalence of multimorbidity in elderly people staying in their home environment and to determine the relationship between multimorbidity and seniors' functional and mental skills.

Material and Methods

The method of a diagnostic survey was applied in the study, with the direct questionnaire technique. A questionnaire of the authors' own construction was used, which allowed to assess the sociodemographic condition of the participants, the occurrence of chronic diseases, and the function of the senses of sight and hearing. Moreover, such standardized tools were applied as the Abbreviated Mental Test Score (AMTS) to evaluate cognitive functions, the Geriatric Depression Scale (GDS) to screen for depression occurrence, and the Barthel and the Lawton scales to assess functional skills. The study involved 504 people aged 66–94 years and was performed in a Subcarpathian municipality in the respondents' home environment.

The dependencies between selected variables were examined with Kendall's tau (τ) coefficient, Kolmogorov–Smirnov test, and Pearson's chi-squared (χ^2) test. When the expected numbers were smaller than 5, the Yates correction and the Kruskal–Wallis test were applied. The value of $p<0.05$ was assumed a sufficient level of significance. All statistical calculations were performed with the use of the STATISTICA 6.0 PL software package.

The study was approved by the Ethics Committee of the Institute of Rural Medicine in Lublin, Poland (Ethics Committee decision No. 25/2013).

Results

While studying the frequency of occurrence of particular disease entities in the investigated group of seniors, we found that the number of diseases observed in the respondents ranged from 0 to 7. Only 0.05% of the analysed patients were not diagnosed with any disease. The most frequent cases were diagnosed with 2 diseases, and the least frequent with 7 (Figure 1). The mean number of diseases equalled 2.98 (SD=1.51; Me=3), and the mean difference between women (3.03; SD=1.44; Me=3) and men (2.90; SD=1.65; Me=3) was not statistically significant ($p>0.10$).

A statistically significant correlation was found between the number of the declared diseases and the patients' age ($\tau=0.1789$; $p<0.001$).

The most commonly occurring disease among the study respondents was hypertension (77.38%), then osteoarthritis (62.10%), and circulatory insufficiency (43.05%). In women, hypertension ($p<0.001$) and osteoarthritis ($p<0.001$) were observed more often than atherosclerosis ($p<0.001$) (Table 1).

Table 1. Disease entities diagnosed among the studied seniors

Disease entities	Total		F		M		χ^2	p
	N	%	N	%	N	%		
Hypertension	390	77.38	276	54.76	114	22.61	23.84	<0.001
Osteoarthritis	313	62.10	232	46.03	81	16.07	28.5	<0.001
Circulatory insufficiency	217	43.05	146	28.96	71	14.08	0.67	>0.10
Atherosclerosis	146	28.96	76	15.07	70	13.88	15.86	<0.001
Diabetes mellitus	114	22.62	80	15.87	34	6.74	1.56	>0.10
Prostatic hyperplasia	60	11.90	0	0.00	60	11.90	–	–
Stroke	46	9.13	31	6.15	15	2.97	0.10	>0.10
Asthma	41	8.13	31	6.15	10	1.98	2.10	>0.10
Neoplasms	13	2.58	9	1.78	4	0.79	0.00*	>0.10
Parkinson's disease	9	1.78	8	1.59	1	0.19	1.32*	>0.10
Alzheimer's disease	6	1.19	5	0.99	1	0.19	0.25*	>0.10
Others	143	28.37	99	19.64	44	8.73	1.38	>0.10

*chi-squared test with Yates correction; N — number of observations; % — percent; χ^2 — chi-square test; p — test probability

Table 2. Disease entities in relation to the participants' age

Disease entities	Participants with the diagnosed disease			Participants without the disease			p
	N	$\bar{x}$	SD	N	$\bar{x}$	SD	
Hypertension	390	77.02	6.57	113	78.74	6.56	<0.05
Osteoarthritis	313	78.46	6.59	191	75.69	6.27	<0.01
Circulatory insufficiency	217	79.42	6.27	287	75.95	6.45	<0.01
Atherosclerosis	146	80.24	6.29	358	76.25	6.39	<0.01
Diabetes mellitus	114	76.96	5.80	390	77.54	6.82	>0.10
Prostatic hyperplasia	60	78.38	6.34	444	77.27	6.64	>0.10
Stroke	46	80.41	5.52	458	77.10	6.63	<0.05
Asthma	41	77.95	5.37	463	77.36	6.71	>0.10
Neoplasms	13	78.08	6.08	491	77.39	6.62	>0.10
Parkinson's disease	9	80.67	6.20	495	77.35	6.60	>0.10
Alzheimer's disease	6	81.33	4.59	498	77.36	6.61	>0.10
Others	146	77.59	6.53	358	76.80	6.83	>0.10

*arithmetic mean of the participants' age; N — number of observations; $\bar{x}$ — mean; SD — standard deviation; p — test probability

The analysis with the Kolmogorov–Smirnov test revealed that seniors suffering from osteoarthritis (p<0.01), circulatory insufficiency (p<0.01), atherosclerosis (p<0.01), and stroke (p<0.05) were older than the remaining respondents. Additionally, patients with no hypertension turned out older than those with the disorder (p<0.05) (Table 2).

The majority of the study population (63.49%; N=320) were visually impaired. 35.91% (N=181) of the respondents described their sense of sight as normal, while 0.60% (N=3) of the respondents were blind. 56.15% (N=283) of respondents used glasses.

Analysis with the chi-square test showed that among the examined people, men more often showed proper functioning of the sense of sight (p<0.05). In turn, women more often declared amblyopia (p<0.05) and the use of glasses (p<0.01).

The analysis of age in relation to visual sense performance showed that people declaring normal vision were younger than people with abnormal vision (p<0.001). No age difference was detected between people using and not using glasses (p>0.10). Due to the small group size, the age of blind people was not compared.

Among the surveyed population, the majority of respondents (52.98%; N=267) rated their hearing as normal. 45.83% (N=231) of the respondents declared themselves as hearing impaired, and 1.19% (N=6) as completely deaf. Hearing aids were used by 36 respondents, which constituted 7.14% of the entire group of respondents and 15.19% of people with hearing problems. Chi-square test analysis showed that more women (60.18%; N=198) than men (39.43%; N=69) declared normal hearing ($p<0.001$). Men, however, more often than women declared hearing loss (58.86%; N=103 to 38.91%; N=128), ($p<0.001$) and the use of a hearing aid (14.86%; N=26 to 3.04 %; N=10), ($p<0.001$).

The analysis of age and hearing ability showed that the subjects with normal hearing were younger (average 75.19) than the subjects with abnormal hearing (79.80) ($p<0.001$). No age difference was detected between people using and not using hearing aids ($p>0.10$).

The analysis with the use of Kendall's tau (τ) coefficient revealed a correlation between multimorbidity and the decrease in the scores obtained in the Barthel ($\tau=–0.3300$; $p<0.001$) and the Lawton ($\tau=–0.3347$; $p<0.001$) scales. With the rising number of diseases, a deterioration was observed in skills related to the Instrumental Activities of Daily Living (IADL) and Activities of Daily Living (ADL).

Moreover, Kendall's tau (τ) test reported an inversely proportional correlation between multimorbidity and AMTS test results ($\tau=–0.1748$; $p<0.001$) (implying a deterioration of the patients' cognitive skills with the increase of the number of their diseases), as well as a significant directly proportional correlation between multimorbidity and GDS scores ($\tau=0.1675$; $p<0.001$; N=495) (implying a deterioration of the patients' emotional status with the increase of the number of their diseases).

Discussion

Together with people's age, the incidence of chronic diseases increases, and so does the demand for medical services provided in patients' home environment [3,9]. More than 50% of seniors are considered to have at least 3 chronic conditions [10]. The most frequent diseases occurring in elderly people include cardiovascular system, locomotor system, and nervous system disorders, as well as injuries and accidents [11].

The PolSenior study, performed among 4979 people aged at least 65 years, coordinated by the International Institute of Molecular and Cell Biology in Warsaw, proved that the vast majority of elderly people experienced more than one condition, and the risk of multimorbidity and dependency increased at the age of 70–84 years [12].

The analysis of the presented results showed that in the vast majority of cases, people aged over 65 years living in rural areas suffered from chronic diseases. Only 1.98% of the respondents had no disease diagnosed, while the remaining part were affected by 1–7 disorders. Among these, the following were predominant: hypertension, osteoarthritis, circulatory insufficiency, atherosclerosis, diabetes mellitus, benign prostatic hyperplasia, and stroke. Borowiak and Kostka, when investigating elderly inhabitants of the Łódź province rural areas, also observed the most common occurrence of hypertension (48.8%), then diabetes mellitus (23.9%), heart failure (22.5%), coronary artery disease (21.6%), osteoarthritis (21.1%), respiratory system diseases, history of stroke (7.4%), and others [9]. Skalska and Gałaś, in their analysis of research performed among geriatric outpatient clinic patients hospitalized because of falls and among institution residents, revealed that the disease most frequently occurring in the studied seniors was hypertension (80%), and then coronary artery disease (47%), osteoarthritis of the joints and spine (46%), diabetes mellitus (35.7%), and heart failure (28.6%) [13].

Vision and hearing dysfunctions are among the main causes of disability in Poland. In older people, these disorders contribute to dependence and social isolation, and thus to a poorer quality of life [14,15].

It is estimated that vision impairment occurs in 20% to 30% of people over the age of 75, and blindness affects 2% of this population [16]. However, hearing impairment affects 32% of people aged 70 to 80 and as many as 50% of people over 80 [17]. Research by many Polish and foreign authors indicates a relationship between age and impairment of the sense of sight and hearing [14,18–20].

In the presented research, it was found that vision disorders affected more than half of the study population, and hearing disorders were declared by almost half of the respondents. It was noticed that both vision and hearing deteriorated with the age of the respondents and that women reported amblyopia more often than men, while men rated their hearing much worse. What is disturbing is the fact that only 7.14% of respondents used hearing aids, which is also confirmed by research by other authors [18].

Multimorbidity is believed to largely determine the functional skills of elderly people [21,22]. This is also supported by own research, which reports that patients with multimorbidity obtained significantly lower scores in the Barthel and the Lawton scales, implying worse performance in simple and complex activities of daily living.

According to numerous researchers, multimorbidity impacts on the emotional and cognitive decline in the elderly [23–27]. These reports are confirmed in this study

as statistical analyses have shown that with the increase in the number of disease entities, the emotional and cognitive skills of the examined seniors deteriorated.

Conclusions

1. The vast majority of people aged over 65 years living in rural areas experienced multimorbidity; the following predominated among the diseases: hypertension, osteoarthritis, circulatory insufficiency, atherosclerosis, and diabetes mellitus.
2. Together with an increase in the number of diseases, a deterioration was observed in the patients' functional, cognitive, and emotional skills.

Implications for Nursing Practice

Multi-morbidity is a common phenomenon, especially affecting people in old age, and when combined with the physiological changes that occur in the human body with age, it often becomes a cause of disability. When caring for elderly people with multi-morbidities, a thorough, regular assessment of their physical, cognitive and emotional condition should be carried out. It is extremely important to control the drugs taken by elderly people, aimed at the occurrence of side effects, interactions between drugs and the duplication of drugs recommended by different specialists or taken without medical indications. When caring for seniors with multi-morbidities, it is very important to conduct educational activities for both seniors and their caregivers in the field of self-care and self-observation as well as providing non-professional care. The problem of multimorbidity in the elderly is a serious care challenge and requires the use of comprehensive therapeutic activities carried out by an interdisciplinary team.

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