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ul. Kilińskiego 109
90-011 Łódź
tel./fax: (042) 676 25 29 wew. 339
e-mail: wydawnictwo@spoleczna.pl

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Support for the People with Visual Impairment and Blindness – a Comprehensive Rehabilitation Project of Therapy Regarding Locomotion, Communication and Physical Activity

Marlena Krawczyk-Suszek[1]
https://orcid.org/0000-0003-4100-588X

Katarzyna Sztaba-Adamczyk[2,3]

[1] Department of Physiotherapy, Faculty of Medicine,
University of Information Technology and Management in Rzeszow, Poland
[2] The Polish Association of the Blind, Rzeszow, Poland
[3] Student Scientific Circle „RehSCIENCE", Department of Physiotherapy,
Faculty of Medicine, University of Information Technology and Management
in Rzeszow, Poland

Address for correspondence

Marlena Krawczyk-Suszek
Department of Physiotherapy, Faculty of Medicine
University of Information Technology and Management in Rzeszow
2 Sucharskiego Str., 35-225 Rzeszow, Poland
e-mail: m.krawczyk.umlub@gmail.com

Abstract

Background and objective: *Visual impairment is a disability which sometimes restricts physical and social area of patient's life. The aim of the research is to assess the purpose of the implemented rehabilitation measures to develope locomotive, communication and physical abilities, as well as to express subjective opinion of people with visual impairment participating in the research about activities as a part of the project. Material and method: The research was performed in the Polish Association of the Blind in the Podkarpackie region among the group of 130 people with visual impairment who took part in the project „Integrated rehabilitation for people with visual impairment or blindness". The research tool was a self-constructed questionnaire. The statistically significant relationship was established at probability value of p≤0,05. Results: The project activities significantly influenced on the communication of impaired people (p=0,023). 42.6% of people with visual impairment noticed a significant change in aspect of communication on a daily basis. Conclusions: Participation in activities offered by the organ supporting impaired people significantly improves their communicative abilities. The therapy and activities introduced by the Polish Association of the Blind increase the efficiency of complex rehabilitation of people with visual impairment by increasing their quality of life.*

Implications for practitioners: *Therapeutic efforts should be made to improve communication and locomotion in the group of people with visual impairment and blindness.*
There is a potential for physical activity among people with visual impairment and blindness to improve balance and coordination in performing daily activities.
The state entities and programs supporting people with visual impairment and blindness have to organize free activities in the field of locomotion and communication improvement of people with visual impairment and blindness.

Key words: *visual impairment, blindness, therapy, rehabilitation, activities of daily living*

Introduction

The correct reception of information depends on the correct development of a receptive sense. The sense of sight allows to receive external stimuli like shapes, colours, changing images, their dynamics, size etc. [1]. Pathology of the organ causes disability. Deficit of information due to ill-functioning visual organ significantly limits ability to learn or acquire motor skills [2]. According to the World Health Organization (WHO), a blind person is someone with complete loss of sight, a person with moderate blindness or with limited field of vision [3]. Visual dysfunction may occur as a result of a congenital malformation or for reasons acquired during life [4].

There are a number of facilities designed to improve the quality of life of people with visual impairment and to decrease social exclusion level. The well-known Braille alphabet, developed throughout the years, is considered the vital cognitive method of the blind and people with visual deficiency [5]. Another group of facilities concern locomotion within urban space, which means properly labelled stairs, in particular the first and the last step, to prevent a disabled person from loss of balance, smooth edges, gentle driveways for wheelchairs and other improvements, including inside the housing environment [6].

Despite numerous facilities and a fast development of technology, the life of a person with visual impairment is restricted by many architectural and social barriers [7]. Although facilities, which significantly improve locomotion of a person with blindness, do not require large financial outlay, sometimes only a significant contrast of paint colours on the wall would be needed to make an obstacle more visible for a person with blindness or to describe buildings in larger fonts. In addition, it is important to build the so-called „attention plates" (a plate with bumps) at pedestrian crossings and a loud warning sound to make pedestrians with blindness safer road users [7].

An important aspect to increase the quality of life is a complex rehabilitation, which involves different activities of a daily life, such as developing computer skill, operating electronical devices, learning to move in

urban space, locomotion technique, singing, dancing, swimming, horse riding, art therapy and other skills, which allow a disabled person to feel like an able-bodied person. Physical activity may not be omitted in this group of disability. A decrease of fitness level negatively affects the quality of life of a person with visual impairment, which leads to lower health condition and diverse illnesses and injuries [8,9].

The aim of the research is to assess the purpose of rehabilitation methods and activities aiming at improving communication, locomotion and physical activity of people with visual impairment. It is necessary to indicate the relationship between conducting therapies, which should facilitate the daily activities of people with visual impairment or blindness, and a subjective assessment of the effectiveness of these activities.

Materials and Methods

Respondents

The research was conducted in a group of 130 people, with the 1st or the 2nd degree of sight disability, who participated in the project "Complex rehabilitation for people with blindness and visually impaired people" in Poland (Institution which conducted a project: the Polish Association of the Blind (PZN) in Poland in the Podkarpackie region). The project lasted from April 1, 2017 to March 31, 2018. People who wanted to participate in the project had to meet the condition of being included in the 1st or the 2nd degree of sight disability and individually apply for classes/therapy. The process of qualifying a given person to the project was conducted by a qualified employee of the PZN. The classes/therapy conducted as part of the project were optional and free of charge.

PZN is the member of the international organizations: World Blind Union (WBU) and European Blind Union (EBU) [10].

Data collection and analysis

The respondents participated in the project voluntarily and anonymously. All of them were citizens of the Podkrapackie voivodeship. The research

regarding the assessment of the conducted therapies in the group of respondents was not subject to any risk. Written permission of the PZN Director (11.07.2017) was obtained to conduct research among people who were included in the project "Complex rehabilitation for people with blindness and visually impaired people". The study was conducted in accordance with the tenets of the World Medical Association Declaration of Helsinki on Ethical Principles for Medical Research Involving Human Subjects.

The research method was a self-designed questionnaire assessing the purpose of implemented activities, therapy in the complex rehabilitation project. If the respondents were not able to fill in the questionnaire themselves, they filled it with the help of their carers.

The analysis of the relationship between the qualitative variables was made using the chi-square independence test. The measurable data was presented using the basic descriptive statistics.

The data was subjected to statistical analysis, and the statistically significant relationship was established at probability value of $p \leq 0.05$.

Results

130 persons were subject to the research, among which 63.1% were women (n=82), the remaining group were men – 36.9% (n=48). The average age of the respondents was 54.9±15.2 years old. The youngest researched person was 18 years old and the oldest was 85. 46.9% of the group came from rural areas (n=61), the remaining group involved citizens of urban agglomerations (n=69, 53.1%). Among all respondents, there were 115 people with partial blindness (88.5%), while 15 were completely blind (11.5%). In the latter group, 12 people were blind since birthday, 2 became blind as a result of an illness and one person could not see as a consequence of an accident. In the group of visually impaired people, 67 were impaired as a result of an illness, 40 were disabled since birthday and the remaining group had visual impairment as a consequence of an injury in an accident (n=8).

The probability rate between the sex of respondents and possibility of visual impairment was calculated at 0.147. The dysfunction of sight as

an inborn defect among women (n=35; 67.3%) was two times higher than for men (n=17; 32.7%). A similar proportion was observed in case of the dysfunction as a consequence of an illness. For women, the number was 63.8% (n=44), and for men, it was 36.2% (n=25). The disability as a consequence of an accident was also analysed. In this group, a number of men was predominant in comparison to women, with 66.7% of men (n=6) and 33.3% of women (n=3). 7 people out of 9, who became blind as a consequence of an accident, lived in rural areas.

Additionally, the circumstances that accompanied the occurrence of visual dysfunction were analysed in relation to marital status of the respondents (p=0.007). The highest number of single individuals indicated that their disability had lasted since they were born. As much as 75% (n=18) of the respondents claimed that they were single as a result of their disability. People whose partner was no longer alive, indicated the cause of dysfunction as a result of the ongoing disease the most often (68.2%). 60.8% of the total number were married and 58.2% of this group became visually impaired in the process of an illness. Another 35.4% of the group were visually disabled since they were born (Table 1).

Within the complex rehabilitation project supporting visually impaired people, the participants were provided with free activities in order to develop different skills, which would improve their everyday functioning in typical environment. The respondents found the therapy activities and improving visual skills as the most interesting (63.8%). In addition, they eagerly participated in fitness gymnastics (54.6%) or art therapy (40.0%). Out of all respondents, 37.7% people used the typhlotechnology, which was organized to improve the participants' computer skills and electronic devices, whereas 29.2% attended everyday activities classes. The rest of the offered classes were less interesting for the participants of the project. They rarely participated in the spatial orientation course or walking with a white stick (9.2%). However, it was closely connected with the fact that only 15 participants were completely blind, and it was organized especially for them. The participation in the offered activities is presented in table 2.

Table 1. The circumstances of the occurrence of visual dysfunction in relations to marital status

Circumstances of the occurrence of visual dysfunction		Marital status					p
		Married	Single	Widow/ widower	Divorced	Total*	
Inborn	n	28	18	5	1	52	0.007**
	%	35.44%	75.00%	22.73%	20.00%	40.0%	
Consequence of an accident	n	5	1	2	1	9	
	%	6.33%	4.17%	9.09%	20.00%	6.92%	
Consequence of an illness	n	46	5	15	3	69	
	%	58.23%	20.83%	68.18%	60.00%	53.08%	
Total	n	79	24	22	5	130	
	%*	60.77%	18.47%	16.93%	3.85%	100,0%	

n – number of observations; % – percent; * – % of the total number; ** – statistically significant

Table 2. Participation in activities/therapy

Type of activity	n	%
Therapy and improving vision	83	63.8
Fitness activities	71	54.6
Art therapy (handicraft and art classes)	52	40.0
Typhlotechnology (computer skills and using other electronic devices)	49	37.7
Everyday activities	38	29.2
Choreoterapy (dance)	38	29.2
English language	34	26.1
Swimming	34	26.1
Singing and drama classes	28	21.5
Gymnastics with elements of martial arts – karate	18	13.8
Using mobile devices and GPS	16	12.3
Spatial orientation and walking with a white stick course	12	9.2

*Σ≠100%, n – number of observations; % – percent

The dependency between the type of disability and a subjective opinion about skills acquired and possibilities of using them in everyday life was assessed. On a scale from 0 to 5, the respondents subjectively assessed the usefulness of the offered activities in everyday life in relation to locomotion, communication and motor ability. Statistically significant dependency was indicated between the type of disability and the influence of conducted activities on communication ($p<0.05$). Other compared variables did not indicate significant dependencies (Table 3).

The influence of activities on communication was assessed higher by the respondents with partial visual impairment. They assessed the influence of activities on developing own communicative abilities as good (35.6%) and very good (42.6%) more often than the other group. The group of people with blindness assessed the influence of activities in reference to communication on average at 40.0% (Table 4).

Table 3. Influence of conducted activities on everyday life considering the type of disability

Compared variables	p
Type of disability and influence of activities on locomotion	0.105
Type of disability and influence of activities on communication	0.023*
Type of disability and influence of activities on motor ability	0.058

p – p value; * – statistically significant

Table 4. Influence of conducted activities on communication considering type of disability

Influence of activities on everyday life considering communication	Type of disability				Total*	
	Person with visual impairment		Blind person			
	n	%	n	%	n	%*
none	0	0.0	0	0.0	0	0.0
very low	0	0.0	0	0.0	0	0.0
low	3	2.6	2	13.3	5	3.8
average	22	19.1	6	40.0	28	21.5
high	41	35.6	5	33.3	46	35.4
very high	49	42.6	2	13.3	51	39.2
Total*	**115**	**88.5**	**15**	**11.5**	**130**	**100.0**

n – number of observations; % – percent; * – % of the total number

Analysing the frequency of participating in the offered activities, only one respondent indicated that he participated in the activities organized by the association supporting disabled people every day. The respondents participated in the activities in every group a few times a week (n=98; 75.4%) the most often. The group of professionally active individuals had the highest rate of participating in the activities only a few times a month (n=5; 16.1% of group). It can be assumed that work prevents them from more often participation in the offered activities.

There is a high dependency of the frequency of participation in the activities organized by the PZN on professional status (p=0.03). It is possible that the respondents' assessment of the activities influenced on the participation frequency. Most of the respondents confirmed that they participated in the activities a few times a week (n=98; 75.4% of total). In this group, the highest number belonged to retired people (45.9%), pensioners (31.6%) and working individuals (16.3%). Professionally active respondents, who may have found it more difficult to organize some spare time for extra activities, participated in them only a few times a month (Table 5).

Disabled people often use different techniques to improve their fitness and physical abilities. The most popular physical activity, apart from the offered activities, which the respondents indicate as the most effective to develop physical abilities and fitness, are regular walks. As many as 78.5% of them used this form of rehabilitation. Less popular, but still quite common among the respondents, was gymnastics at home (34.6%) and rehabilitation holidays (33.8%), as well as endurance exercises, for instance riding a stationary bike (30.8%). The least frequent method involved team games and other forms of activity such as swimming pool or gym (Table 6).

Table 5. Frequency of participation in the activities offered by the Polish Association of the Blind considering professional status

Professional status	Frequency of participation in activities								Total		p
	Every day		Few times a week		Once a week		Few times a month				
	n	%	n	%	n	%	n	%	n	%*	
Retired	0	0.0	45	45.9	11	52.4	2	20.0	58	44.6	0.032**
Pensioner	1	100.0	31	31.6	8	38.1	1	10.0	41	31.5	
Employed	0	0.0	16	16.3	2	9.5	5	50.0	23	17.7	
Pupil	0	0.0	2	2.0	0	0.0	0	0.0	2	1.5	
Student	0	0.0	4	4.1	0	0.0	1	10.0	5	3.8	
Unemployed	0	0.0	0	0.0	0	0.0	1	10.0	1	0.8	
Total	**1**	**100.0**	**98**	**100.0**	**21**	**100.0**	**10**	**100.0**	**130**	**100.0**	

n – number of observations; % – percent; * – % of the total number; ** – statistically significant

Table 6. Types of additional activities improving physical abilities and fitness*

Own methods to improve physical abilities and fitness	n	%
Regular walks	102	78.5
Gymnastics at home	45	34.6
Rehabilitation camps	44	33.8
Endurance exercises (i.e. stationary bike)	40	30.8
Nordic Walking	23	17.7
Other (most often swimming pool or gym)	11	8.5
Team games	10	7.7
No physical activity	3	2.3

*Σ≠100%; n – number of observations; % – percent

The dependency between the type of disability and the subjective assessment of the influence of physical activity on coordination and balance was also assessed. Statistically significant dependencies were not reported. However, people with blindness (40.0%) indicated very significant influence of physical activity on coordination and balance more often than people with partial visual impairment (33.0%). An opposite tendency was observed in both groups in the aspect of the influence of physical activity on coordination during everyday activities. 44.3% of people with partial visual impairment and 33.3% of people with blindness indicated a significant influence.

A dependency of high significance was reported between the type of dysfunction and the act of losing orientation in places familiar to the respondents (p=0.000). The dependency relies on the fact that people with partial visual impairment do not lose orientation, while people with blindness experience this problem more often. Only one blind person claimed that he had never lost orientation in a familiar place. Among the group of people with blindness, the most frequent answer about losing orientation in a familiar place was: several times (46.7% people with blindness) or very often (13.3%). People with partial visual impairment do not lose orientation in a familiar place (73.9% of people with partial visual impairment) the most often. On average less than every tenth person with partial visual impairment (10.4%) noted loss of orientation in a familiar place for a few times. There are no respondents with partial visual impairment, who experienced a frequent loss of orientation in a familiar place (Table 7).

An important element of a blind person's everyday functioning is the ability to of self-mobility in a town, public buildings and possibility of using public transport on one's own. A third of the total number (33.3%) describe themselves as completely dependent when they travel around the town, commute with public transport and visit public institutions. Only one person with partial visual impairment (0.9%) described his/her self-reliance at the same level. 59.13% of the group of people with partial visual impairment, described themselves as completely self-reliant, whereas 37.4% of them need only a little help, which means that they consider themselves rather self-reliant.

Table 7. Type of visual impairment vs. self-assessment of the influence of physical activity on balance and coordination and loss of position awareness in a familiar background

Self-assessment of the influence of physical activity on balance and coordination	Type of disability				Total		p
	Person with visual impairment		Person with blindness				
	n	%	n	%	n	%*	
Low	4	3.5	1	6.7	5	3.8	0.821
Moderate	22	19.1	3	20.0	25	19.2	
High	51	44.3	5	33.3	56	43.1	
Very high	38	33.0	6	40.0	44	33.8	
Total	115	100.0	15	100.0	130	100.0	
Loss of position awareness in a familiar background							
None	85	73.9	1	6,7	86	66.1	0.000**
Yes – once	18	15.6	5	33.3	23	17.7	
Yes – a few times	12	10.4	7	46.7	19	14.6	
Yes - frequently	0	9.2	2	13.3	2	1.5	
Total	115	100.0	15	100.0	130	100.0	

n – number of observations; % – percent; p – p value; * – % of the total number; ** – statistically significant

There is no dependency between the type of visual dysfunction and the self-assessment of physical fitness of the respondents. Their own physical fitness is equally perceived by both group of the respondents: with visual impairment and blindness. The significance level p=0.983 reveals that there is no dependency of the analysed variables. In both groups, the self-assessment at good level, and then at the satisfactory level dominate. Low assessment is also the least common among both groups of people: with visual impairment (4.3%) and blindness (6.7%).

The respondents were asked to make a subjective assessment of their health on a scale from 5 (excellent) to 1 (very bad). Excellent health condition was assessed rarely (3.5% of people with partial visual impairment and 0.0% of people with blindness). However, a more positive phenomenon was observed in both groups of people (48.7% of people with partial visual impairment and 46.7% of people with blindness) who assessed their health level as very good. Bad health was indicated by only one person with partial visual impairment. None of the respondents noted very bad health level.

The subjective self-assessment of health condition in both groups is very similar. The significance level at p=0.855 proves that there is no dependency between the type of dysfunction and health self-assessment (Table 8).

Table 8. Self-assessment of physical fitness, self-reliance assessment and health self-assessment considering the type of visual dysfunction

Self-assessment of physical fitness	Type of disability				Total		p
	Person with visual impairment		Person with blindness				
	n	%	n	%	n	%*	
Very good	16	13.9	2	13.3	18	13.8	0.983
Good	55	47.8	7	46.7	62	47.7	
Satisfactory	39	33.9	5	33.3	44	33.8	
Low	5	4.3	1	6.7	6	4.6	
Total	115	100.0	15	100.0	130	100.0	
Self-reliance assessment							
Completely self-reliant	68	59.1	1	6.7	69	53.1	0.000**
Rather self-reliant – needs a little help	43	37.	4	16.7	47	36.1	
Rather non self-reliant	3	2.6	5	33.3	8	6.1	
Completely non self-reliant	1	0.9	5	33.3	6	4.6	
Total	115	100.0%	15	100.0	130	100.0	
Health self-assessment							
Very bad	0	0.0	0	0.0	0	0.0	0.855
Bad	1	0.9	0	0.0	1	0.8	
Satisfactory	54	47.0	8	53.3	62	47.7	
Very good	56	48.7	7	46.7	63	48.5	
Excellent	4	3.5	0	0.0	4	3.1	
Total	115	100.0	15	100.0	130	100.0	

n – number of observations; % – percent; p – p value; * – % of the total number; ** – statistically significant

Discussion

Disability is a social problem, which increasingly concerns the Polish society and the world's population. The aging process of the society additionally increases the number of people with acquired disability or difficulties. It is the effect of a longer life span and decreasing number of live births. Other causes of disabilities involve accidents, injuries and long-lasting disease processes or inborn defects [11,12]. Apart from health issues, every day, disabled people experience difficulties restricting their functioning in the society, prevent them from fulfilling their roles in the society or hinder communication, which leads to discrimination and prevents them from education, professional training or finding suitable job [13].

In response to the needs of disabled people, a number of institutions supporting them in different aspects of life were established, such as rehabilitation, social or professional support. These regulations are guaranteed by the international documents and laws concerning a particular country [14]. The Polish nation is obliged to conduct activities supporting disabled people by the Constitution, which according to the provisions of Art. 68 (3) imposes on the authorities of the country the obligation to ensure special health care to all disabled people as well as sustain their existence, predispose them to work and enable social communication, which is stated in Art. 69 [15]. The respondents of the research participated in the project, which covered the activities developing and improving competences of individuals with visual impairment. Introducing a number of technological facilities to analyse and recognise the surroundings by people with partial visual impairment and even more by people with blindness significantly increases their possibilities to participate in social life [16].

A crucial aspect of life is the assessment of own health among the disabled people. Analysing the available data, one cannot easily find many publications concerning the frequency of modern civilization diseases among the disabled, specifically among people with visual impairment. Comparative tests of fully-able members of the society and citizens with partial

visual impairment or blindness in the same age groups reveal that general health deteriorates among the disabled [17] much more often and that the number of modern civilization diseases in this group increases [18].

According to the available publications, one of the causes of the statistics is a low physical activity in the analysed group in comparison to physical activity of presented by healthy members of the society [19, 20]. Different aspects of life can be the evidence of physical activity. One of the methods of testing physical activity among people with visual impairment offered by researchers was measuring the number of steps taken daily. Individuals with visual dysfunction took on average 5992 steps, which was half the number of the fully-able individuals (9742) [21]. In addition, an increased physical activity after the disability appeared was determined by the activity of an individual before the dysfunction had appeared [22]. Therefore, physical fitness in the aspect of maintaining good health is an integral part of prophylaxis. In the analysed group, 47.8% of the total number assessed their fitness as good.

Support for the disabled people significantly influence on the level of perceptible quality of life. According to the available publications, the quality of life is a multidimensional, interdisciplinary concept, which means that it combines different aspects of life [23]. From the sociological perspective, this concept is defined as satisfying basic and important needs of an individual, whereas from the psychological perspective, it means wellbeing of an individual in the psychological sphere [24]. In the researched group, the dependency between the level of disability (partial visual impairment – blindness) and their self-assessment of health was not confirmed (p=0.855), which, according to the available literature, is one of the factors influencing the perception of the general quality of life. Almost in equal percentages, i.e. approximately 48%, the respondents noted their health level as satisfactory or very good. A slightly higher number of people with visual dysfunction (61.4%) assessed their health level as very good in other publications. Both researches confirm and have similar results to the researches of Poles in general, where 57% of the respondents noted their health level as at least good [25].

Conclusions

- The respondents use the free activities organized by the institutions supporting people with visual impairment and blindness a few times a week.
- Participating in the activities significantly influence on developing communicative abilities among people with visual impairment and blindness.
- Activities and therapy offered by the Polish Association of the Blind increase the effectively of complex rehabilitation of people with visual impairment and blindness by improving their quality of life.

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Comparison of Knowledge and Opinions of Students of the Medical University of Lodz and the University of Lodz about Vaccinations

Adam Rzeźnicki[1]
https://orcid.org/0000-0002-9926-721X

Justyna Kazimierska[2]

[1] Department of Social Medicine, Medical University of Lodz
[2] Polish Sign Language Philology, Faculty of Polish Studies, University of Warsaw

Address for correspondence

Adam Rzeźnicki
Department of Social Medicine
Medical University of Lodz
7/9 Żeligowskiego Str., 90-752 Lodz, Poland
e-mail: adam.rzeznicki@umed.lodz.pl

Abstract

Introduction: *The use of vaccines and the introduction of mandatory preventive vaccinations over the past two centuries has helped to control, and in some cases completely eliminate, serious infectious diseases and significantly improve the epidemiological situation.*
Objectives: The aim of the study was to learn and compare the knowledge and opinions of students of the Medical University of Lodz and the University of Lodz about preventive vaccinations.

Material and methods: *The study was conducted from February to May 2018 among first-year students of selected MA studies at the Medical University of Lodz and the University of Lodz. When collecting empirical material, the author's survey questionnaire was used, intended for students to fill in individually.*

Results: *In the group of all respondents, more than half of the respondents, i.e. 52.5% (105 people) thought that vaccinations are definitely safe for the body. In the group of students of the University of Medical Sciences such persons constituted 56.0%, while among those studying at the University of Lodz this percentage was smaller and amounted to 49.0%. In the group of students of the University of Lodz, 11.0% of respondents (11 people) were of the opinion that protective vaccinations are unlikely to be safe for humans.*

Conclusions: *The level of knowledge of students about preventive vaccinations is insufficient. Medical students have a higher level of knowledge compared to non-medical students. Lack of knowledge and misconceptions about preventive vaccinations among young people may lead to increased prevalence of lack of child vaccination in the future.*

Key words: *vaccinations, students, knowledge, health behaviours*

Introduction

The concept of "vaccine" in the sense of a biological preparation that enhances immunity to a given disease, as well as the concept of vaccination were introduced in 1796 by Edward Jenner. Jenner conducted a medical experiment in which he used the infectious vaccinia pox material to vaccinate an eight-year-old boy, which resulted in an effective immunisation against smallpox virus. It should be emphasised, however, that the advances in vaccines initiated the discoveries of Louis Pasteur and Robert Koch. In 1885 L. Pasteur made the first effective vaccinations that protected against rabies virus. He also developed a method for rapid virus propagation by breeding it in rabbit organisms and its attenuation by draining the cerebrospinal fluid. R. Koch, however, during his research on the cholera vibrio proved that a single infection protects against subsequent infections during the same epidemic. The first attempts to use killed V. cholerae cells for immunisation were made at the end of the 19th century by Jaime Ferrán [1].

Immunisations are a way of immunising the body, which is based on giving a person a preparation called a vaccine. It is a cheap and effective form of preventing infectious diseases. The vaccine is a biological product that contains substances capable of causing immunological processes conditioning the acquisition of immunity without causing toxic effects [2].

Very often the terms "vaccination" and "immunisation" are used interchangeably. However, there is a difference between them, because the first concept means active prevention and the second means intervention that can be both active and passive. The task of vaccination is to elicit an immune response like that arising from reinfection after infection with a natural microorganism. Post-vaccination long-term immunity is associated with the emergence of antigen-specific "effectors" and memory cells. The first group includes antibodies capable of binding toxins or microorganisms and cytotoxic T lymphocytes that recognise and destroy the pathogen [3].

Undergoing vaccination, a person is slightly exposed to the occurrence of adverse reactions of the body to the preparation, i.e. reactions or vaccination complications. Although the use of preventive vaccinations carries a very small risk of these complications, it should be remembered that in no way does it counterbalance the threat to which a non-immunised person is exposed. Vaccination is the most effective tool in combating and preventing infectious diseases and prepares the human body to confront pathogens [4]. Preventive vaccinations reduce the incidence, number of complications and deaths, and ultimately, as in the case of smallpox, they allow to completely eliminate the disease [5,6].

The use of vaccines and the introduction of mandatory preventive vaccinations over the past two centuries has helped to control, and in some cases completely eliminate, serious infectious diseases and significantly improve the epidemiological situation. In the US and Western Europe, the incidence of infectious diseases and related mortality compared to the time before the introduction of mandatory vaccination decreased by 95-99%. Thanks to the use of vaccines, the incidence of diseases such as diphtheria, tetanus, mumps, measles, rubella and poliomyelitis has decreased by over 90% [7,8,9].

According to data from the World Health Organization (WHO), vaccinations save lives of about 2-3 million people every year.

Objectives

The aim of the study was to learn and compare the knowledge and opinions of students of the Medical University of Lodz and the University of Lodz about preventive vaccinations.

Material and methods

The study was conducted from February to May 2018 among first-year students of selected MA studies at the Medical University of Lodz and the University of Lodz. When collecting empirical material, the author's

survey questionnaire was used, intended for students to fill in individually. The survey consisted of 28 multiple-choice questions and a metric consisting of 5 questions. The survey was voluntary and anonymous. Respondents were asked to complete the questionnaire after the classes. The study involved 100 students of the University of Lodz studying in the following fields: cosmetic chemistry, pedagogy, psychology, accounting and Slavic philology, and 100 students of the Medical University studying nursing, dietetics and public health. The data contained in the surveys were entered in the MS Excel spreadsheet. To develop the collected empirical material, descriptive methods and statistical inference methods were used. For the description of the whole examined group and subgroups distinguished on the basis of qualitative features, structure indicators were calculated, which were expressed as a percentage [%]. To compare the incidence of particular categories of quantitative features in the analysed groups, the chi-square independence test or chi-square independence test with Yates's correction was used. The results for which the values of the statistics obtained in the conducted tests belonged to the critical area of the relevant distribution at the significance level p=0.05 were considered significant. For statistical analysis, STATISTICA version 10.1 was used.

Results

Among all students (200 people), the clear majority were women, i.e. 84.0% (168 people). Among the students of the Medical University, women constituted 89.0% (89 people), while among those studying at the University of Lodz 79.0% (79 people) (p>0.05) (Tab. 1).

Among all respondents, most respondents were aged 23-24 (85.0%, 170 people). In the group of students of the Medical University, people aged 23-24 constituted 82.0% of the respondents, and at the University of Lodz 88.0% (p>0.05) (Tab. 1).

In the group of all students, the largest group, i.e. 42.0% of respondents (84 people) were residents of cities with a population of over

100,000. The largest number of students at the Medical University, i.e. 32.0% of the respondents (32 persons) lived in cities with a population of up to 50,000, while among students of the University of Lodz the largest number were residents of cities with a population of over 100,000 (59.0%, 59 people). The observed differences turned out to be statistically significant – $p<0.05$, $Chi^2=25.505$ (Tab. 1).

Among all students, the majority, i.e. 86.0% (172 persons) believed preventive vaccinations are definitely effective in protecting children against infectious diseases. This opinion was shared by all students at the Medical University and 72.0% of respondents studying at the University of Lodz (Tab. 2).

In the group of all respondents, more than half of them, i.e. 52.5% (105 people) thought that vaccinations are definitely safe for the body. In the group of students of the University of Medical Sciences such persons constituted 56.0%, while among those studying at the University of Lodz this percentage was smaller and amounted to 49.0%. In the group of students of the University of Lodz, 11.0% of respondents (11 people) believed protective vaccinations are unlikely to be safe for humans. The observed differences in the responses of students of the Medical University and the University of Lodz turned out to be statistically significant - $p<0.05$, $Chi^2=14.479$ (Tab. 3).

In the group of all respondents, the most of them, i.e. 41.5% (83 people) had no opinion on the legitimacy of protective vaccination against influenza. Among the students of the Medical University, the largest group, 57.0%, were people who considered flu vaccination to be quite legitimate. Among students at the University of Lodz, most respondents (60.0%) had no opinion on this subject. The observed differences turned out to be statistically significant - $p<0.05$, $Chi^2=78.542$ (Tab. 4).

Table 1. Respondents' characteristics

Gender	Medical University		University of Lodz		Total		p
	N	%	N	%	N	%	
Female	89	89.0	79	79.0	168	84.0	>0.05
Male	11	11.0	21	21.0	32	16.0	
Total	100	100.0	100	100.0	200	100.0	
Age	**N**	**%**	**N**	**%**	**N**	**%**	**p**
23-24	82	82.0	88	88.0	170	85.0	>0.05
25-26	17	17.0	9	9.0	26	13.0	
27 and more	1	1.0	3	3.0	4	2.0	
Total	100	100.0	100	100.0	200	100.0	
Place of residence	**N**	**%**	**N**	**%**	**N**	**%**	**p**
Village	26	26.0	17	17.0	43	21.5	<0.05 Chi^2=25.505
City to 50,000 residents	32	32.0	19	19.0	51	25.5	
City over 50 to 100,000 residents	17	17.0	5	5.0	22	11.0	
City over 100,000 residents	25	25.0	59	59.0	84	42.0	
Total	100	100.0	100	100.0	200	100.0	

Table 2. Comparison of opinions of students of the Medical University and the University of Lodz about the effectiveness of vaccination in protecting children against infectious diseases

Opinions on vaccination effectiveness	Medical University		University of Lodz		Total	
	N	%	N	%	N	%
They are definitely effective	100	100.0	72	72.0	172	86.0
They are rather effective	0	0	27	27.0	27	13.5
No opinion	0	0	1	1.0	1	0.5
Total	100	100.0	100	100.0	200	100.0

Table 3. Comparison of opinions of students of the Medical University and the University of Lodz about the safety of vaccination in protecting children against infectious diseases

Opinions on the safety of preventive vaccinations for children	Medical University		University of Lodz		Total		p
	N	%	N	%	N	%	
They are definitely safe	56	56.0	49	49.0	105	52.5	<0.05 Chi^2= 14.479
They are rather safe	41	41.0	40	40.0	81	41.2	
They are rather unsafe	0	0	11	11.0	11	5.5	
They are definitely unsafe	0	0	0	0	0	0.0	
No opinion	3	3.0	0	0	3	1.5	
Total	100	100.0	100	100.0	200	100.0	

Table 4. Comparison of opinions of students of the Medical University and the University of Lodz on the legitimacy of vaccination against influenza

Opinions on the legitimacy of influenza vaccination	Medical University		University of Lodz		Total		p
	N	%	N	%	N	%	
They are definitely legitimate	12	12.0	23	23.0	35	17.5	<0.05 Chi^2=78.542
They are rather legitimate	57	57.0	1	1.0	58	29.0	
They are rather not legitimate	7	7.0	16	16.0	23	11.5	
They are definitely not legitimate	1	1.0	0	0	1	0.5	
No opinion	23	23.0	60	60.0	83	41.5	
Total	100	100.0	100	100.0	200	100.0	

Among all respondents, more than half of them, i.e. 53.0% (106 people), when asked whether vaccinations should be mandatory, answered that they definitely should. In the group of students at the Medical University, people claiming so constituted 69.0%, while among students of the University of Lodz the percentage of people who had the same opinion was significantly lower and amounted to 37.0% ($p<0.05$, $Chi^2=48.303$) (Tab. 5).

Among the total number of respondents, the largest group, i.e. 45.5% of students (91 people) were people who disagreed with the views and activities of anti-vaccination movements. In the group of students of the Medical University such opinion was expressed by 74.0% of respondents (74 people), while among those studying at the University of Lodz the percentage of such was significantly lower and amounted to 17.0%. In the group of students of the University of Lodz, the largest number of people, i.e. 42.0%, claimed that they had never encountered anti-vaccination movements. The observed differences in the responses of students of the Medical University and the University of Lodz turned out to be statistically significant – $p<0.05$, $Chi^2=78.012$ (Tab. 6).

Among all respondents, the largest number of people, i.e. 42.0% (84 people) indicated health care workers (e.g. a doctor) as the main source of knowledge about preventive vaccinations. In the group of students of the Medical University, the most frequently indicated source of knowledge about protective vaccinations were classes at the university (74.0% of respondents), while among those studying at the University of Lodz – healthcare workers; this was the answer given by 60.0% of respondents ($p<0.05$, $Chi^2=116.242$) (Tab. 7).

Table 5. Comparison of opinions of students of the Medical University and the University of Lodz on whether preventive vaccination should be mandatory

Opinions on whether preventive vaccination should be mandatory	Medical University		University of Lodz		Total		p
	N	%	N	%	N	%	
Definitely yes	69	69.0	37	37.0	106	53.0	<0.05 Chi^2=48.303
Rather yes	31	31.0	25	25.0	56	28.0	
Rather no	0	0	16	16.0	16	8.0	
Definitely yes	0	0	0	0	0	0.0	
No opinion	0	0	22	22.0	22	11.0	
Total	100	100.0	100	100.0	200	100.0	

Table 6. Comparison of opinions of students of the Medical University and the University of Lodz on anti-vaccination movements in Poland

Opinions on anti-vaccination movements in Poland	Medical University		University of Lodz		Total		p
	N	%	N	%	N	%	
Fully support their activity	0	0	0	0	0	0.0	<0.05 Chi^2=78.012
Partially support their activity	2	2.0	18	18.0	20	10.0	
They disagree with their views and activities	74	74.0	17	17.0	91	45.5	
They have no opinion because they do not know the details of the activities of such movements	19	19.0	23	23.0	42	21.0	
They have not encountered such movements	5	5.0	42	42.0	47	23.5	
Total	100	100.0	100	100.0	200	100.0	

Among all respondents, the most numerous group was people who assessed their knowledge about preventive vaccinations as average (42.5% of respondents, 85 people).

Most students of the Medical University rated their knowledge in the area as average (54.0% of respondents), while those studying at the University of Lodz as poor (69.0% of respondents). The observed differences turned out to be statistically significant – $p<0,05$, $Chi^2=117,281$ (Tab. 7).

Table 7. Comparison of sources and self-assessment of knowledge of students of the Medical University and the University of Lodz about preventive vaccinations

Main sources of knowledge about preventive vaccinations	Medical University		University of Lodz		Total		p
	N	%	N	%	N	%	
Health care worker (e.g. doctor)	24	24.0	60	60.0	84	42.0	<0.05 Chi²=116.242
Classes at the university	74	74.0	0	0	74	37.0	
Family/friends	5	5.0	34	34.0	39	19.5	
Internet	35	35.0	40	40.0	75	37.5	
Press	15	15.0	18	18.0	33	16.5	
Specialist literature	7	7.0	18	18.0	25	12.5	
Self-assessment of knowledge about preventive vaccinations	N	%	N	%	N	%	p
Very good	0	0	0	0	0	0.0	<0.05 Chi²=117.281
Good	45	45.0	0	0	45	22.5	
Average	54	54.0	31	31.0	85	42.5	
Poor	1	1.0	69	69.0	70	35.0	
Very poor	0	0	0	0	0	0	
Total	100	100.0	100	100.0	200	100.0	

Discussion

In Poland, according to the preventive vaccination program, free (i.e. mandatory) vaccines are available, which provide the narrowest scope of protection, as well as paid (i.e. recommended) vaccinations, broadening the spectrum of protection against infectious diseases [10,11,12]. The implementation of the vaccination program is mandatory, while the decision to carry out the recommended vaccinations depends on the parents. The decision to purchase additional vaccinations is often conditioned by financial possibilities, but above all reliable information about the possibilities of using these vaccinations and about the benefits resulting from them can help make a decision, which is undoubtedly an investment in the child's health [13]. Therefore, it is necessary to educate parents to understand the great importance of preventive measures and to obtain social support for activities promoting protective vaccination [14].

Analysis of the results of the collected empirical material showed that knowledge about preventive vaccinations among students is insufficient. Students of the Medical University due to the specifics of their studies presented greater knowledge, which in effect translated into correct opinions on preventive vaccinations. In the group of students of the University of Lodz, the prevalence of disturbing opinions about preventive vaccinations, such as: uncertainty as to their safety, opposition to the obligation of preventive vaccinations or support for the activities of anti-vaccination movements was significantly higher than in the group of students of the Medical University. Lack of knowledge and misconceptions about preventive vaccinations among young people may escalate the phenomenon of not vaccinating children in the future.

Students of the University of Lodz pointed to healthcare professionals (e.g. doctors, nurses) as the main source of knowledge about preventive vaccinations. Therefore, it is particularly important to properly prepare medical staff to perform the functions of health educators in the field of protective vaccination.

Health education in the field of preventive vaccinations, carried out by a doctor and a nurse, mainly concerns their promotion also as a component of a healthy lifestyle. Constantly introduced new, more improved vaccines make this method effective and safe. However, some parents are reluctant to vaccinate their children, even if they are mandatory, among other things because they cause iatrogenic stress and pain. The unpleasant sensations associated with a visit to the vaccination room and vaccine preparations are eliminated by the efforts of medical staff, professional and good care and a pleasant atmosphere [15].

Another reason for parents' fear of vaccination is the possibility of adverse vaccination reactions. For a parent, the purpose of vaccinating their child is first and foremost to protect them against an infectious disease that they may or may not have. In this situation, the acceptance of adverse vaccination reactions is difficult, especially since healthy children come to be vaccinated, and most vaccinations are carried out in infancy and early childhood. Therefore, the knowledge provided to parents about preventive vaccinations must be reliable and supported by facts. Parents should be aware of the possibility of adverse vaccination reactions, but at the same time comparing this risk with the potential risks arising from contracting an infectious disease [16,17].

The dynamic situation observed in recent years in the implementation of effective immunoprophylaxis in Poland, which aims to further develop the preventive vaccination program in line with trends that are observed in other European countries, creates the need for reliable and permanent education about preventive vaccination. This requires from medical staff – a doctor and a nurse – not only extensive and up-to-date medical knowledge about vaccinations, but also the ability to communicate effectively with the patient or their parents and to build the atmosphere of trust in their relations with them. As shown by the results of research conducted in Poland in the field of decisions regarding vaccinations, medical staff is the most reliable source of information about them [18,19,20].

Conclusions

1. The level of knowledge of students about preventive vaccinations is insufficient. Medical students have a higher level of knowledge compared to non-medical students.
2. Allowing students to participate in additional, optional classes devoted to the issue of preventive vaccinations, especially in non-medical fields, can effectively increase young people's knowledge in the area. Students were aware of their gaps in knowledge about preventive vaccinations. Most students of the Medical University rated their knowledge about vaccinations as average, while those studying at the University of Lodz as poor.
3. Lack of knowledge and misconceptions about preventive vaccinations among young people may lead to increased prevalence of lack of child vaccination in the future.
4. There is a need to conduct further, systematic research into the knowledge, attitudes and opinions of students about preventive vaccinations in order to implement effective educational programs targeted at young people.

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Assessment of the Prevalence of the Disability Phenomenon in Poland as a Determinant of the Health Status of the Population

Monika Burzyńska[1]

Elżbieta Dziankowska-Zaborszczyk[1]

Irena Maniecka-Bryła[1]

[1] Epidemiology and Biostatistics Department, the Chair of Social and Preventive Medicine of the Medical University of Lodz, Lodz, Poland

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Address for correspondence

Monika Burzyńska
Epidemiology and Biostatistics Department, the Chair of Social and Preventive Medicine of the Medical University of Lodz
7/9 Żeligowskiego Str., 90-136 Lodz, Poland
e-mail: monika.burzynska@umed.lodz.pl

Abstract

Introduction: *Assessment of population health lies in the centre of attention of medical and social sciences. Medical advancement prolongs life span and contributes to an increasing number of the elderly.*

Aim: *The aim of this study was to assess the prevalence of the disability phenomenon as a determinant of the health status of the Polish population, including socioeconomic variables, causes of disability, its severity and territorial differences in this aspect.*

Material and methods: *The research material was a database containing information on population aged 18. and over with a disability certificate issued in 2010-2017 (data from the Ministry of Labor, Family and Social Policy). The analysis of empirical data enabled a detailed analysis of the prevalence of the phenomenon of legal disability in Poland in the context of new cases in the period covered by the study.*

Results: *In the analyzed period, the percentage of newly issued certificates increased until 2015, when it amounted to 1.81%, after which it began to decrease. In 2017 this percentage amounted to 1.44% (553 674 of issued certificates). The most common cause of disability in both men and women was the locomotor disorder – 27.0% and 33.0% respectively. In terms of issued certificates, a moderate degree of disability prevailed – 50.1%. Territorial differentiation in the scope of issuing decisions about disability was observed. In 2017 the highest percentage of new disability occurred in the świętokrzyskie province, where it accounted for 2.5% of the total population, while the lowest was in mazowieckie, where it accounted for 0.9% of these region population.*

Conclusions: *An in-depth, reliable evaluation of epidemiological situation, disease burden and burden-related disability is the reason for implementing activities which aim at improving health in societies, eliminating health differences and providing the disabled with equal opportunities.*

Key words: *disability, health status, Poland*

Introduction

The phenomenon of ageing populations is a characteristic feature of demographic processes observed worldwide. Most countries in the European Union deal with problems affecting ageing societies, which calls for a need to cooperate and exchange experiences in this area. An increased percentage of the elderly in the whole population will undoubtedly affect the health condition and health needs of societies [1, 2]. According to prognoses of the United Nations, the elderly will make up a greater and greater part of the whole population and will contribute to increased prevalence of disability, which is a result of chronic diseases [3]. This situation brings many social, demographic and health challenges. One of the most crucial elements of strategies and solutions in the area of social and health policy is creating conditions which will allow the elderly to enjoy health and stay active and self-dependent as long as possible [4]. Healthy ageing, being the most supreme value of each individual person, has become the supreme value of each society [5]. Extending years of healthy life is one of the most important conditions for improving the quality of life of older people and their families. Therefore, in the face of the ongoing aging of the Polish population, there is a need to make appropriate reforms in the health and social policy system that meet new health and socio-economic challenges [6]. The aging of the population is inseparably connected with the problem of disability because its frequency increases rapidly after the age of 50. You can become a disabled person at any age, but throughout your life, as a result of injuries, birth defects, and chronic diseases, health often deteriorates, preventing normal daily functioning to varying degrees. The extent of disability determines the health condition of society, and the assessment of this phenomenon is an important element of health assessment [7,8]. The forecasts of the Central Statistical Office of Poland assume that by 2050 the percentage of people aged 65 and over in the general population will increase by 19 percentage points. This has serious consequences. With age, chronic diseases

accumulate, which are a factor significantly impeding the independent fulfillment of needs and increasing the demand for health services as well as those in the field of social assistance, especially in the form of care services [9]. According to numerous long-term studies, including Framingham Heart Study or EPESE (Established Populations for Epidemiologic Studies of the Elderly) diseases that particularly reduce the efficiency of older people are: depression, stroke, heart disease, degeneration of the joints (mainly knee) and fractures (especially the femoral neck). After 75 years of age, however, in addition to the listed diseases, common geriatric problems such as urination and stool disorders, dementia, urinary tract infections, falls, injuries, difficult to heal wounds, ulcerations based on venous and arterial insufficiency often appear, impaired vision and hearing. The result of the above situation is a clear increase in the demand for social assistance. Growing polypathology with increasing age and progressive physical disability often leads to prolonged immobilization and complete loss of independence. This creates the need to implement preventive measures in the health and social care system, including preventive actions directed against diseases and other adverse health phenomena before their development. This is important in preventing disability and limiting and mitigating its effects, and thus in improving quality life of the individual, and consequently the entire population [10,11].

Disability, as defined by the World Health Organization in 1980, is defined as „a limitation or lack of ability to perform activities in a manner or to the extent considered normal for humans, resulting from damage and impairment of bodily functions." According to WHO, people with disabilities are those who are unable, alone or partly or completely, to ensure the possibility of normal individual and social life as a result of inborn or acquired physical or mental impairment [12]. The term disability is still not entirely unambiguous. So far, however, no better term has been found. This term replaces many hitherto existing in society such as: disability, infirmity, which have acquired pejorative meaning. The purpose of this study was to assess the prevalence of disability as

a determinant of the health status of the polish population, taking into account socioeconomic variables, causes of disability, its severity and territorial differences in this aspect.

Material and methods

The research material was a database containing information on persons aged 16. and over, who have a disability certificate issued in 2010--2017 (data from the Ministry of Labor, Family and Social Policy). The empirical data obtained was coded and entered into Excel. The following measures were used in the statistical analysis of data: structure indicators, location measures for measurable features – arithmetic mean, median, modal, minimum, maximum. The analysis of empirical data enabled a detailed analysis of the prevalence of legal disability in Poland in the context of newly adjudicated cases in the period covered by the study in relation to variables such as: sex, age, marital status, education, cause and severe of disability, as well as territorial differentiation of this phenomenon.

Results

The results of the study showed that in 2010 in Poland in the population of people aged 16. and over, 591,519 new disability certificates were issued, which means that the problem of emerging disability concerned 1.54% of the country's population. During the studied period the percentage of newly issued certificates increased until 2015, when it amounted to 1.81%, after which it began to decrease (Figure 1).

In 2017, this percentage was 1.44% (553,674 rulings issued). The structure of the population of disabled people by sex did not show clear differences in this respect. 50.7% were women and 49.3% men. Married persons dominated among the respondents (52.1%). 23.2% of the respondents were unmarried. Every tenth respondent was divorced or separated. Men most often had vocational education (31.3%), while women

had secondary education (34.1%). The least respondents were people with higher education (10.2%). The largest number of new disability certificates in 2017 were issued for people in the age group 18-64 – 68.7%.

The characteristic of the studied sample according to socio-demographic characteristics is presented in Table 1.

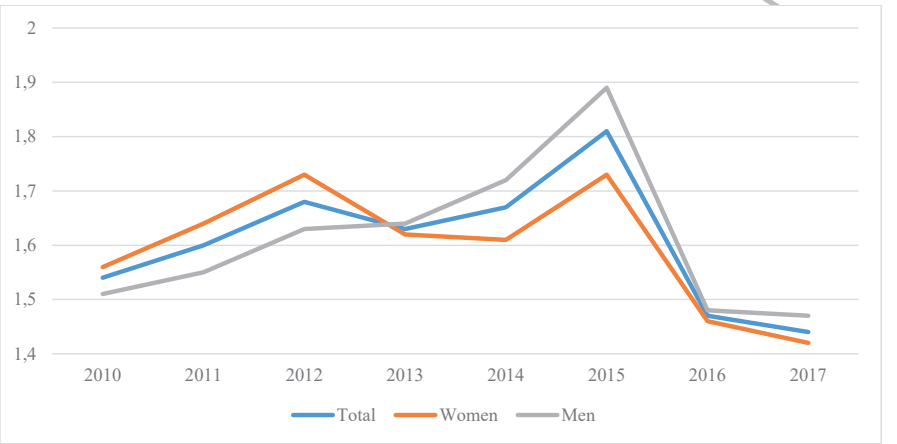

Figure 1. The percentage of newly issued certificates in Poland, 2010-2017

Table 1. Characteristic of the studied sample

	Women N=280 933 (50,7%)	Men N=272 757 (49,3%)	Total N=553 690 (100,0%)
Age			
<18	2,3%	3,1%	2,7%
[18-64]	66,3%	71,1%	68,7%
≥65	31,4%	25,8%	28,7%
Marital status			
unmarried	17,5%	29,2%	23,2%
divorced or separated	10,6%	10,7%	10,7%
widowed	22,6%	5,1%	14,0%
married	49,3%	55,0%	52,1%
Education level			
elementary	29,4%	28,8%	29,0%
vocational	23,8%	38,9%	31,4%
secondary	34,2%	24,6%	29,4%
high	12,6%	7,7%	10,2%

The most common cause of the stated disability in both men and women was impairment of the musculoskeletal system – 27.0% and 33.0% respectively. Data on the causes of disability for persons who had a legal decision issued in 2017 are presented in Table 2.

Table 2. Causes of disability in 2017 by sex

Cause	Sex				Total	
	Women		Men			
	n	%	n	%	n	%
holistic developmental disorders	363	0,1%	1707	0,6%	2070	0,4%
vision disorders	7854	2,8%	6828	2,5%	14682	2,7%
neurological diseases	36612	13,0%	40278	14,8%	76890	13,9%
mental disorders	32517	11,6%	32346	11,9%	64863	11,7%
genitourinary diseases	17622	6,3%	9607	3,5%	27229	4,9%
respiratory and cardiovascular diseases	37526	13,4%	56316	20,6%	93842	16,9%
digestive system diseases	8849	3,1%	12411	4,6%	21260	3,8%
epilepsy	3839	1,4%	4444	1,6%	8283	1,5%
other	27843	9,9%	18109	6,6%	45952	8,3%
muscosceletal disorder	92600	33,0%	73711	27,0%	166311	30,0%
intellectual disability	3987	1,4%	5353	2,0%	9340	1,7%
voice, speech and hearing disorders	11311	4,0%	11641	4,3%	22952	4,1%
Total	280923	100,0%	272751	100,0%	553674	100,0%

A moderate degree of disability dominated in the scope of issued decisions – 50.1%. 27.5% of respondents had a significant degree of disability. Territorial differentiation in the issue of disability decisions was observed. In 2017, among all issued certificates, the most (11.6%) were decisions issued in the śląskie province and the least in the opolskie province (1.9%), as shown in Table 3.

Table 3. Disabled people by sex and province (2017)

Province	Sex				Total	
	Women		Men			
	n	%	n	%	N	%
Dolnośląskie	21439	7,6%	21989	8,1%	43428	7,8%
Kujawsko-Pomorskie	17096	6,1%	17073	6,3%	34169	6,2%
Łódzkie	20017	7,1%	19632	7,2%	39649	7,2%
Lubelskie	14291	5,1%	13744	5,0%	28035	5,1%
Lubuskie	10104	3,6%	9335	3,4%	19439	3,5%
Małopolskie	17251	6,1%	17022	6,2%	34273	6,2%
Mazowieckie	24629	8,8%	24731	9,1%	49360	8,9%
Opolskie	5195	1,8%	5529	2,0%	10724	1,9%
Podkarpackie	20804	7,4%	20065	7,4%	40869	7,4%
Podlaskie	8390	3,0%	8262	3,0%	16652	3,0%
Pomorskie	21121	7,5%	20407	7,5%	41528	7,5%
Śląskie	33625	12,0%	30769	11,3%	64394	11,6%
Świętokrzyskie	15939	5,7%	15351	5,6%	31290	5,7%
Warmińsko-Mazurskie	15182	5,4%	14375	5,3%	29557	5,3%
Wielkopolskie	25387	9,0%	23266	8,5%	48653	8,8%
Zachodniopomorskie	10453	3,7%	11201	4,1%	21654	3,9%
Razem	280923	100,0%	272751	100,0%	553674	100,0%

The highest percentage of occurring disability concerned the świętokrzyskie province, where it constituted 2.5% of the total population, and the lowest mazowieckie province, where it constituted 0.9% of the provinces population.

Discussion

Disability is a serious social and health problem, and therefore diagnosing the prevalence and conditions of this phenomenon is one of the important elements in assessing the health situation of societies [13].

Age and sex are the basic determinants of human susceptibility to various diseases, and, as a consequence, affect the intensity of the consequences of past diseases and injuries, i.e. temporary or permanent disability. Research indicates that the main group of causes of disability are chronic diseases (in about 77% of cases), followed by accidents, injuries and poisoning (13%) and birth defects (7%). It is characteristic that chronic diseases are more often the main source of disability among women (a difference of approximately 12 percentage points), while accidents, poisonings and injuries are more common, more than twice, for men. Cardiovascular diseases (44%) and musculoskeletal dysfunction (43%) are the most frequently mentioned groups of disorders that cause disability. Disability due to neurological diseases accounts for over 25% of the total causes of disability. 13% of people are disabled due to damage to the vision and 6% due to damage to the hearing organ. About 8 out of 100 people with disabilities are people with mental illnesses or mental retardation. The structure according to the basic demographic features of the discussed subsets of the disabled is a derivative of age at the time of disability. Research shows that every twentieth person becomes disabled in childhood, i.e. before the age of 15, and every twentieth person becomes disabled as an adult. Most often, however, disability arises between the ages of 40 and 55 (in nearly every second person). The moment of occurrence of incomplete functional ability varies among men and women. Women more often than men become disabled in post-working age,

slightly less often in younger working-age ranges. This is related to the degree of exposure to factors causing disability, resulting from the living and working environment, as well as to the different biological structure of the organism for women and men. The majority of disabled persons aged 15 and over are dominated by persons with issued mild (41%) and moderate (36%) disability certificates. The vast majority (74%) of disabled people have been issued certificate in connection with the recognition by the relevant authority of disability as permanent [14].

According to the results of the National Census (NC) 2011, disabled people constituted 12.2% of the population of Poles (4,697,100). Disability assessed on the basis of the NC was divided into three categories: legal disability (supported by an appropriate certificate); biological disability (related to problems in everyday functioning but without formal certificate) and both legal and biological (coexistence of both variants). People with biological disabilities have been defined as people experiencing restrictions on normal (basic) life activities appropriate to their age. There are 3 degrees of limited ability to perform basic activities: complete, serious or moderate. In all these cases, the inability to perform the abovementioned the activities had to last or were expected to last for at least 6 months. The number of people with disabilities only legally amounted to 479 500, only biologically 1 565 600, while legally and biologically (simultaneously) was 2 652 000. It should be emphasized that the data from the last two Censuses (2002 and 2011) indicate reducing the total number of disabled people (by 759 700, i.e. by 13.9%), but it should be noted that this decrease applies primarily to people with legal disabilities, which is the result of tightening the regulations governing the rules for issuing disability certificates. Thus, it should be noted that the number of people with only biological disabilities increased in the same period by 559 000 thousand, i.e. by 55.5%. It was also shown that in older age groups the percentage of people showing biological disability also clearly increased (from 20.0% in urban areas and 22.1% in rural areas aged 65-69 to 42.9% and 46.2% respectively 80 years and older) [15].

Long-term studies conducted in the period 1960-2003 also showed that with age, disability clearly leads to a restriction of independent movement. The most common causes of these disorders were diseases of the circulatory system, musculoskeletal system (including most often degenerative changes, osteoporosis and its complications), neurological diseases (e.g. paresis after stroke) and the organs of vision and hearing. In studies conducted at the end of the nineties by the Central Statistical Office, it was found that in the group of people aged 60 and over, 2.1% still stay in bed, 5.8% are unable to leave the apartment alone, 17.1% remain limited only to the environment of the house, while a dozen or so percent are unable to independently perform basic tasks such as dressing, washing up, etc. Over 80 years old, 8.2% of people stay in bed constantly, 15.5% move, but are unable to independently leave flats, and 29.2% have mobility limited to the immediate surroundings of their home. As a result, 74.2% of all people above 65 years of age and only 45.4% at the age of 80 and above retain the ability to move freely, which with the constantly increasing average life expectancy (in Poland in 2017 at 81.8 years for women and 74.0 years for men respectively) is a very serious challenge. Deterioration of the physical ability of older people has serious social consequences, because these people must more often use various forms of health care, care services and permanent family assistance [16].

As a result of the increase in the percentage of older people in society, a large increase in the number of chronically ill and disabled people is expected in the coming years. It can therefore be assumed that undertaking actions in the field of health promotion, developing services that generally improve within the framework of various forms of rehabilitation, as well as improving access to medical services could create a chance to reduce the projected increase in the proportion of elderly people with disabilities in the future [17,18].

Due to its universality and consequences, disability is one of the most serious phenomena in the modern world. The extent of the phenomenon and its intensity imposes on the state, which is the subject of social policy, the obligation to take measures to prevent its occurrence and mitigate

the negative effects. This brings with it the need to conduct in-depth and innovative research in this area, the results of which could contribute to the implementation of measures aimed at preventing disability and bridging health gaps [19,20].

Conclusions

A detailed, credible assessment of the epidemiological situation and the burden of disease on society, as well as the resulting disability, forms the basis for implementing actions to improve the health of societies and leveling differences in health, and to equalize the opportunities for people with disabilities. In the research aspect, epidemiological assessment of the disability problem is a very important link in the process of its prevention and leveling its effects.

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Competences of the Clinical Trials Site in the Assessment of Sponsors and Cro Companies

Dominika Cichońska-Rzeźnicka[1]
https://orcid.org/0000-0001-8623-4307

Agnieszka Szauer[2]

[1] Department of Social Medicine, Medical University of Lodz, Poland
[2] Jasne Błonia Hospital and Outpatient Clinic, Poland

Address for correspondence

Dominika Cichońska-Rzeźnicka
Department of Social Medicine, Medical University of Lodz
7/9 Żeligowskiego Str, 90-752 Lodz, Poland
email: dominika.cichonska@umed.lodz.pl

Abstract

Introduction: *The study, the results of which are presented in this article, describes the relationship between the structures of the Clinical Trials Site and representatives of the CRO (Contract Research Organization) and Sponsors.*

Objectives: *The aim of the study is to determine which factors of these relationships have the greatest impact on the positive or negative assessment of the Clinical Trials Site in the opinion of Sponsor and CRO companies.*

Material and methods: *The study, using a questionnaire, was conducted on a randomly selected sample of 270 clinical trials of Clinical Research Sponsors present on the Polish market, CRO companies and entrepreneurs conducting clinical trials commissioned (freelancers).*

Results: *Based on the analysis of the survey results and suggestions of people who cooperate with the Clinical Trials Site on a permanent basis, it should be stated that while the Clinical Trials Site is a fairly highly rated health care facility, the main advantage is the qualified medical staff working on modern diagnostic equipment.*

Conclusions: *The analysis of the answers given by 189 respondents clearly showed that the hypothesis about the equal participation of the Site's technological aspects and the education and qualification of staff in relation to the share of aspects of the business approach to the contracting relationship was incorrect.*

Key words: *clinical studies, trials, registries, accounts of centers participating in clinical trials*

Introduction

Clinical trials are one of the indicators of the efforts to improve human existence on the plane of the most important factor conditioning human life. This work is to assess the importance of relations between the companies commissioning and financing clinical trials and the site where the research is conducted. The results of the study showed whether the innovative approach to pharmaceutical premium innovative approach in contacts between contractors, and rapid adaptation lead to an increase in the relative value of the site and, as a result, increase the possibility of conducting clinical trials.

According to the Pharmaceutical Law "a clinical trial is any trial involving humans to discover or confirm clinical, pharmacological, including pharmacodynamic, effects of one or more investigated medicinal products, or to identify adverse effects of one or more investigated medicinal products, or tracking the absorption, distribution, metabolism and excretion of one or more investigated medicinal products, with a view to their safety and efficacy" [1]. In this understanding, patient treatment is not the main purpose of the clinical trial, but only one of the options [2]. Participation in a clinical trial is also associated with the risk of the patient not responding to therapy or the risk of deterioration of health. Clinical trials are carried out in particular to determine the therapeutic benefit or lack thereof, to prove the safety and tolerance of the test substance, as well as to objectively observe the safety and efficacy of the medicinal product in a given health situation [3]. The long-term goal is to reduce the cost of treatment and improve the patient's quality of life [4,5]. It happens that the clinical trial is the only method of comparing existing therapy methods to determine the most effective and also the safest treatment regimen [6,7].

Pursuant to the provisions of the Regulation of the European Parliament and of the Council of the European Union, a clinical trial must meet any of the conditions [8]:

- the therapeutic strategy is not a standard of clinical practice and the participant's allocation is determined in advance,

- the decision to include a participant in the biomedical study is the same as the decision to prescribe the investigated medicinal product,
- the participant – in addition to standard clinical practice – is subject to additional diagnostic/monitoring procedures.

The need to conduct clinical trials is explained by the provisions of the Helsinki Declaration, according to which: "Medical progress is based on scientific research, which in the final stages must include research involving humans. (...) The basic goal of medical research conducted with the participation of people is to understand the causes, development and effects of diseases and to improve preventive, diagnostic and therapeutic interventions (methods, procedures and treatment)" [9].

For patients suffering from diseases whose previous treatment, which exhausts all available therapies as standard, has not given results, the clinical trial is the last chance – if not for a complete cure, than a significant improvement in the quality of life, especially in the case of terminal diseases. Clinical trials are one of the most important elements of creating a new drug – over 60% of financial resources on the development of a given drug are the costs of clinical trials [7]. This share is constantly growing, mainly due to the increasingly higher, and thus increasingly more expensive, safety standards for the use of medicinal products and increasingly advanced medical technologies used in modern therapies. Due to demographic, epidemiological and technological prognosis, it should be presumed that this trend will continue [6].

Not only the costs of conducting clinical trials are increasing. With the development of medicine and technology and the growing number of so-called "civilization diseases" also the number of clinical trials increases at an exponential rate. In the last 19 years, the number of registered trials has increased more than 123 times – Table 1 [10].

Table 1. Number of clinical trials registered in the years 2000-2017

Year:	Number of clinical trials registered
2000	2119
2001	3892
2002	5270
2003	8858
2004	12024
2005	24824
2006	35741
2007	48295
2008	65868
2009	82887
2010	100240
2011	118063
2012	137535
2013	157984
2014	181306
2015	205437
2016	233246
2017	262446

Source: own study based on the list of registers [10].

Material and methods

The aim of the study, the results of which are presented in this article, is to assess the relationship between the structures of the Clinical Trials Site and representatives of the CRO (Contract Research Organisation) and Sponsors. Particular emphasis was placed on examining which factors of these relationships have the greatest impact on the positive or negative assessment of the Clinical Trials Site in the opinion of Sponsor and CRO companies.

As part of the work, the following research questions were formulated:

1. Does the assessment of the Clinical Research Site depend on the territorial scope of the unit conducting the clinical trial?
2. Do the soft competences of employees of Clinical Research Sites and additional components manifested during service and

availability/contact options have a greater impact on the overall image of the Site among Sponsors/CRO than their substantive knowledge?

3. How does the Sponsor/CRO assess the Site from the angle of courtesy and personal culture of its employees?
4. What is the significance of the availability and readability of information about clinical trials and the Site itself (its strengths and weaknesses) in this assessment?
5. Which of the elements – qualifications of the medical staff or availability of the latest diagnostic technologies – is more important in the Site's assessment?

The tool used in the study was a survey conducted in October 2018 – February 2019 among randomly selected 270[1] Clinical Research Sponsors, CRO companies and entrepreneurs present on the Polish clinical trials market conducting commissioned clinical trials (freelancers). The study was conducted by e-mail (162 questionnaires were distributed this way), on paper (92 questionnaires were distributed this way) and by telephone interview (interviews were conducted for14 questionnaires). A feedback response was obtained from 189 respondents, achieving a 70% response rate.

[1] The sample size (262 representatives of the population) was calculated according to the formula:

$$n = \frac{N\left(Z^2 \times P(1-P)\right)}{N \times e^2 + Z^2 \times P(1-P)}$$

where:
n – sample size
N – population size (assumed was 2878 – the number of business entities registered in Poland with 72.19.Z PKD subclass)
Z – confidence level value in the normal distribution for the assumed significance level: 1.96
P – he predicted size of the population fraction (it was assumed that about 20% of all enterprises with 72.19.Z PKD subclass carry out clinical trials, by type of research in individual branches of the subclass)
e – standard estimation error of 5%

Results

The vast majority of respondents were CRO companies – 67% of all respondents, followed by Sponsors – 29% of respondents, and persons offering on-demand clinical trials – 4% of respondents. The territory of operation of the assessment units is presented in Diagram 1.

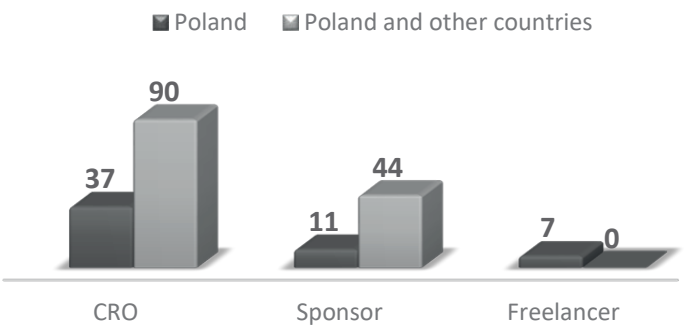
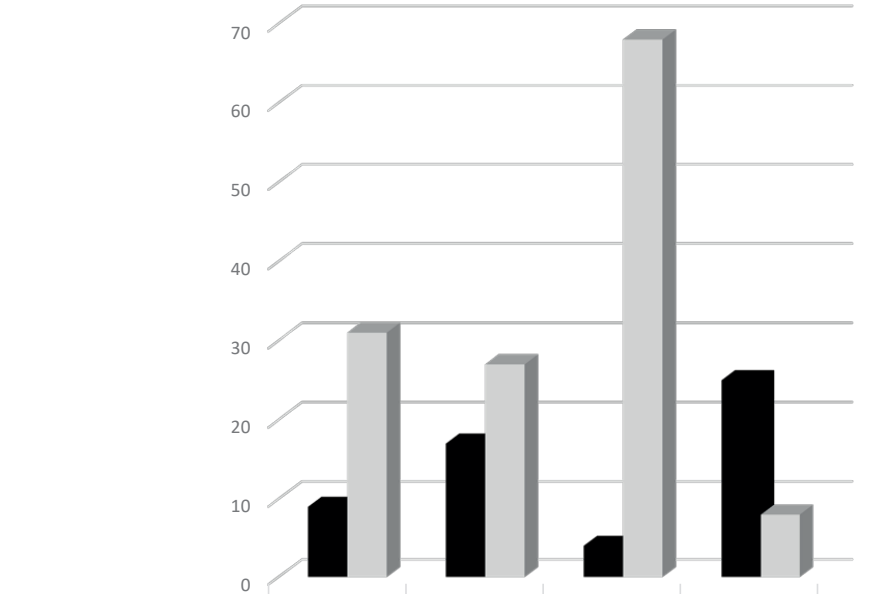


Diagram 1. Territory of operation of assessment units

In the case of units operating internationally out of 134 examined, almost 70% of respondents gave the Site an overall rating of 4 (on a scale of 1-5, where 1 is the lowest and 5 the highest). Over a half of the respondents considered that Polish Sites are competently weaker than foreign Sites, while every fifth respondent rated Polish Sites as good as Sites in other countries. Among the remaining answers, there were 27 claims that national Sites are better organised than those of international reach.

Among the 55 respondents whose facilities conduct clinical trials only on the territory of the Republic of Poland, the highest possible overall rating prevailed, i.e. 5 (85% of respondents in this group). The vast majority of respondents assessd Polish Sites as better organised than the international ones – Diagram 2.



	Just as good organization	Polish centers rated better	Foreign Centers rated better	No opinion
Units operating only in Poland	9	17	4	25
Units operating also in other countries	31	27	68	8

Diagram 2. Site evaluation depending on the operating range of the assessment unit

The list of scores obtained for each of the components of the Clinical Research Site assessment is presented in Table 1. The highest number of maximum ratings – 10 points – from respondents (137 maximum ratings) were obtained by managerial staff qualifications, while the lowest the time of service of the trial – only 13 maximum ratings. The average rating of both components is 9 and 6, respectively – tables 1 and 2 and Diagram 3 present the detailed distribution of scores.

Table 1. Average grade received for each component of the Site's rating

FACTOR	AVERAGE GRADE
Service time	6
Professionalism	8
Staff knowledge level	8
Kindness and personal culture of staff	8
Readability and availability of information on clinical trials in the Site	7
Contact availability	8
Technological capabilities (apparatus, possibility of performing procedures)	9
Qualifications of medical staff	9
Site organisation	8

Table 2. Summary list of scores obtained by individual elements affecting the evaluation of the Clinical Research Site

GRADE	SERVICE TIME	PROFESSIONALISM	STAFF KNOWLEDGE LEVEL	KINDNESS AND PERSONAL CULTURE OF STAFF	READABILITY AND AVAILABILITY OF INFORMATION ABOUT THE SITE	CONTACT AVAILABILITY	TECHNOLOGICAL CAPABILITIES (APPARATUS, POSSIBILITY OF PERFORMING PROCEDURES)	QUALIFICATIONS OF MEDICAL STAFF	SITE ORGANISATION
1	9	2	2	1	3	2	0	0	0
2	4	0	5	1	2	1	0	0	3
3	12	1	5	0	13	2	0	1	2
4	33	0	10	5	12	3	1	3	5
5	7	6	15	16	12	10	4	6	15
6	11	5	17	29	20	14	8	8	19
7	34	43	24	14	26	18	10	9	19
8	38	35	20	22	28	29	11	11	38
9	28	34	43	43	34	33	34	14	42
10	13	63	48	58	39	77	121	137	46

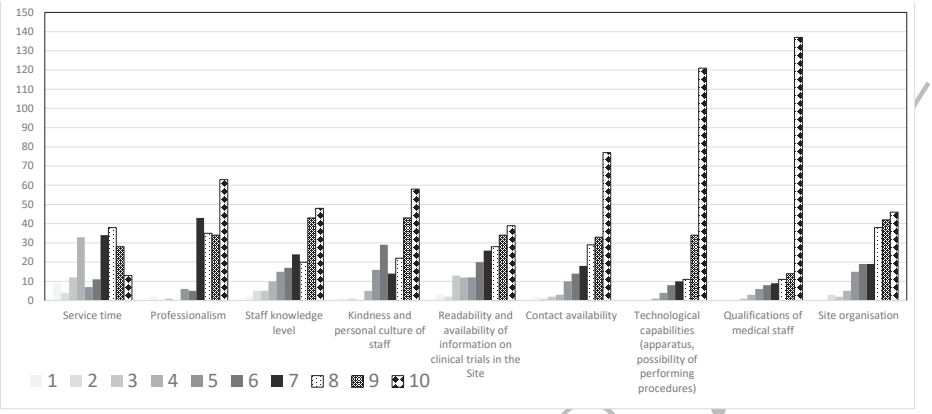


Diagram 3. Scoring of individual components of the Centre's assessment

Discussion and Conclusions

Based on the results of the survey, it should be stated that the majority of clinical trials are conducted by international units. The main determinant of this situation is the universal and multiple-site nature of most clinical trials. Therefore, it can be assumed that the assessment of the Clinical Research Site largely depends on the scope of activity of the company conducting the given research. Negative assessment of the site conducting the survey on a national scale is primarily related to the unfavourable result of comparing it to other facilities of this type outside Poland. On this basis, it can be concluded that the national Sites are still imperfect: they need to be systematised and finally unified in organisational terms – both on the part of the sites themselves and the legal regulations. Without these changes, they will still be rated worse than the international ones.

The impact of the soft competences of the employees of Clinical Research Sites on the assessment of cooperation with the Site

According to the results of the study, the professionalism and all soft skills of the employees of Clinical Research Sites are important and af-

fect its overall assessment. However, the substantive knowledge of employees is still rated the highest. In addition, the results of the study showed that the knowledge of medical staff and administrative employees of the surveyed Sites is at a high level and is positively assessed by respondents. Therefore, it should be concluded that the most accurate way to improve the overall assessment of the Site is to focus efforts and training on education, raising technical and technological qualifications and competences.

Assessment of the Site by the Sponsor/CRO in terms of the personal culture of the site's employees

The broadly understood personal culture in the presented study was defined as the ability to act adequately to the situation in accordance with the principles of savoir-vivre, generally accepted social norms and respect for other people. It consists not only of intellectual values and emotional intelligence, but also: morality, learned behaviour patterns, personality, communication skills, self-control, as well as care for personal hygiene and health [11]. Given the high prestige of clinical trials, the results of the study are surprising. The respondents assessed the importance of the personal culture of the employees of the Site (with whom they often have contact only by phone) on average at 8/10. This means that it is still not a priority aspect not only for the Site itself, but also for its employees.

The impact of the availability and readability of information on clinical trials and the Site itself on its overall assessment

Clinical trials are a highly innovative field. It is even more surprising that the use of new technologies and communication routes is uneven at individual stages of the research. While conducting the research itself, medical and information technologies are used (diagnostics, documentation), in the research administration, knowledge about the Site and broadly

understood marketing, the average rating of information accessibility is only 7. The solution to the problem may be the introduction of appropriate software, as well as a review of the number of people employed to handle the research. Often, a dozen or so years pass from the Sponsor's search for information about a potential Site until the closure of the research, so the most advisable is the proportionality of employment growth to the number of opened projects. This is confirmed by the results of international studies in the field of „tracking clinical trials" [12]. To facilitate the availability and readability of information on clinical trials, followed by a comparative analysis of the frequency of publication of clinical trial results by academic institutions and private companies, two solutions are recommended: improving the links between registration and publication, for example through institutional policies for academic institutions and private companies, and comprehensive and transparent research reporting [13,14].

Strengths and weaknesses of the Sites

The results of the study clearly show that the weakest element of handling a clinical trial at the Site is the long time it took to carry out administrative procedures. It is true that the decision to start the trial, sign a contract or prepare appropriate documentation are highly complex and legally bound processes, but appropriate technological solutions and modification of the work organisation system can have a positive impact on this aspect of the trial. Similar results are presented in the study recommending the use of outsourcing strategies and IT technologies in clinical trials [15].

In turn, the strongest side of the Clinical Research Site is the perfectly educated medical staff with appropriate knowledge, experience and qualifications, enabling impeccable performance of the examination, compliance with the law, protocol, and out of concern for patient safety. The Site is likewise highly rated in terms of medical technologies, i.e. availability of diagnostic equipment and readiness to introduce further innovative solutions.

Because international research results show that well-educated clinical trial staff often rotate between the Sites, The Clinical Trials Transformation Initiative (CTTI) was created due to the need to understand the causes of high migration rates among researchers who conduct clinical trials regulated by American Food and Drug administration in research sites. Because the researcher's knowledge and experience directly affect the quality and ultimate success of clinical trials, researcher marketing has important implications for the research company as well as patients and other stakeholders who depend on the results of clinical trials. The CTTI team used the findings from quantitative and qualitative research, as well as input from an expert meeting with many stakeholders to outline key researchers' concerns and recommend practical action-based solutions. The recommendations focus on strengthening four key categories of on-site research activities: developing research infrastructure and on-site staff, optimising research performance and research, improving site budget development and contract negotiations, and discovering additional testing opportunities [16].

Impact of qualifications of medical staff and availability of new diagnostic technologies on assessment of the Site

The results of the conducted surveys clearly indicate an even distribution of the assessment of the qualifications of the medical staff and the technological capabilities of the Site. Both aspects received high scores – average evaluation of 9. Undoubtedly, these are the two most important factors for the Sponsor/CRO which build a positive image of the Clinical Research Site.

Possibilities of Sponsors/CRO participation as equal partners in remodelling of the Clinical Research Site

The proposed changes, unfortunately submitted only in 6 cases, concerned:

- waiting time for administrative activities ("would significantly improve the terms of cooperation if the conclusion of the contract for the examination did not last so long", "please reduce the waiting time for decisions of the legal department", "my proposal – more people to work"),
- the possibility of contacting representatives of the Site (" (...) on-call duty of the person responsible after the hospital administration's working hours"), and
- the possibility of performing diagnostic procedures and the scope of health services provided ("I suggest considering making PETA[2] available for examinations, because separate contracting and transport of the patient increases costs and causes logistic difficulties" "We also conduct phase II-IV clinical research in allergology: is it possible to conduct such a study at your place?")[3]. Unfortunately, the results of the study indicate that only slightly more than 3% of the respondents decided to propose solutions leading to improvement in the functioning of the Clinical Research Site. This is an alarmingly low result, taking into account the potential benefits of dialogue between the parties, which proves that the model of joint work of different organisations while modernising the area of clinical trials on many levels is still in the theoretical phase.

International research in this area shows the need to create an academic research organisation in each country in order to efficiently design, conduct, coordinate and analyse clinical research, the so-called centre for clinical trials and data coordination [17].

The attempt to answer the research questions asked on the basis of the collected survey results and suggestions of people who cooperate with the Clinical Trials Site on a permanent basis, it should be stated that

[2] Refers to the possibility of performing the Positron Emission Tomography on Site.
[3] Quotes from questionnaires received, the original spelling was retained.

while the Clinical Trials Site is a fairly highly rated health care facility, the main advantage is the qualified medical staff working on modern diagnostic equipment. The business approach to the Sponsor/CRO and the Site as contractors and business partners is only in the initial phase – one can be sure that, as in other sectors of the economy, this area will change too, but at present it should be stated that the value of the Clinical Trial Site is defined by the level of education of the scientific staff and technological advancement of the diagnostic equipment possessed, with a less significant impact on the quality of mutual contractual relations.

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Changes in the Lifestyle and Metabolic Disorders in the Representative Group of Polish Adults in the Years 2003-2014

Sylwia Kamińska[1]

Małgorzata Pikala[2]

Wojciech Drygas[1]

Magdalena Kwaśniewska[1]

[1] Department of Preventive Medicine, Medical University of Lodz, Poland

[2] Department of Epidemiology and Biostatistics, Medical University of Lodz, Poland

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Address for correspondence

Magdalena Kwaśniewska
Department of Preventive Medicine
Medical University of Lodz,
7/9 Żeligowskiego Str., 90-752 Lodz, Poland
e-mail: magdalena.kwasniewska@umed.lodz.pl

Abstract

Introduction: *Monitoring temporal changes in the prevalence of most important behaviours and clinical characteristics seems crucial for creating effective health promotion interventions.*

Aim: *The main purpose of this analysis was to estimate ten-years changes in the lifestyle characteristics and metabolic components in a representative sample of Polish adults.*

Material and methods: *A sample of 2381 (1099 men) participants of the WOBASZ and WOBASZ II Projects aged ≥20 years old was analysed in the context of 10-year changes (2003-2014) in lifestyle and metabolic characteristics. Smoking and physical activity were analysed by interview. Anthropometric data, blood pressure, serum concentration of glucose and lipids were analysed by standard methods. Metabolic syndrome (MetS) was diagnosed using the International Diabetes Federation definition.*

Results: *The percentage of adult smokers declined substantially both in men and women in the studied period. The analysis of leisure-time physical activity level revealed that the prevalence of participants being active on most days of week decreased in both genders in the years 2003-2014. The percentage of women with waist circumference above 80 cm changed from 59.2 to 67.5 % ($p<0.01$). In men, waist circumference above 94 cm increased from 46.8 to 54.3% in 10-year observation ($p<0.05$). Of other metabolic characteristics, significant changes were observed in both genders, especially in glucose concentration ($p<0.001$). Moreover the percentage of persons with elevated blood pressure increased, especially in women ($p<0.001$) (Table 3). The prevalence of MetS also increased importantly, in women from 23.7 to 28.9% between the surveys ($p<0.01$) while in men from 31.4 to 37.8% ($p<0.05$).*

Conclusion: *Most of analyzed behaviors and clinical characteristics have worsened in recent years in Poland. As premature mortality in Poland is still high, caused mainly by cardiovascular diseases, it seems crucial to elaborate novel strategies focused on the prevention of metabolic syndrome.*

Key words: *lifestyle, physical activity, metabolic syndrome*

Introduction

Unhealthy behaviours, mainly sedentary lifestyle and tobacco smoking, ale responsible for the epidemic prevalence and mortality of chronic noncommunicable diseases [1-4]. On the other hand, there is increasing body of evidence that a healthy lifestyle can have positive effects on the cardiovascular and metabolic status, all-cause mortality as well as work ability and quality of life [6-10].

Metabolic syndrome (MetS) is a patophysiological cluster of risk factors predisposing to increased risk of mortality due noncommunicable diseases [11]. Many different definitions have been used, but generally a combination of three or more components should be verified: central obesity, elevated triglycerides, low HDL – cholesterol, elevated blood presssure and high fasting blood glucose.According to the findings of Hu et al. persons with the MetS have an increased risk of death from all causes as well as cardiovascular diseases [12]. Healthy lifestyle including non-smoking and sufficient physical activity (PA) may provide substantial cardiometabolic benefits [13-15].

Monitoring temporal changes in the prevalence of most important behaviours seems crucial for creating more effective health promotion strategies. Data on trends in lifestyle and clinical parameters from middle-income countries are less known.

Therefore, the purpose of this study was to estimate ten-years changes in the lifestyle characteristics and metabolic components in a representative sample of Polish adults.

Material and methods

Participants

Analyzed data were taken from two nationwide cross-sectional surveys: Multi-Centre National Population Health Examination Survey WOBASZ (2003-2005) and WOBASZ II (2013-2014). The study sample consisted of the randomly selected adult residents of three administrative areas of

Poland (Lodz, Silesian and Lublin voivodeship) participating in above two surveys. These regions were selected as those where the mortality statistics due to CVD are among the highest in the country.

The WOBSZ projects were conducted by the Institute of Cardiology in Warsaw in cooperation with 5 medical polish universities. The aims and methods of the studies were described in previous papers [16,17]. After eliminating participants with incomplete data, the study group involved 1099 men (784 in WOBASZ and 315 in WOBASZ II) and 1282 women (873 in WOBASZ and 409 in WOBASZ II) aged ≥ 20 years old.

Data collection

All procedures were conducted by the specialized professionals (nurses, health educators, trainers). The methodology was elaborated on the basis of the WHO MONICA protocol [18] and comprised: a questionnaire interview, anthropometric blood pressure, heart rate measurements, and a blood sample collection. The study questionnaire contained extensive questions on medical history, socio-economic variables, health knowledge, behaviours, lifestyle, nutrition, social support and depression. In the current assay the following sociodemographic factors were considered: age, residential status, educational degree, marital status, smoking. The subjects were divided into the three groups of place of residence according to the number of residents in their living area [16,17].

People who had never smoked and ex-smokers were included to the group of non-smokers.

Physical activity evaluation was based on the WHO MONICA record and CINDI Health Monitor Questionnaire. Similar set of questions was used in previous studies carried out in Polish population [14,15,19]. Data on leisure-time PA were self-reported. The examples of questions concerning leisure-time PA are as follows: “Do you regularly do physical exercises (for ex. running, walking, swimming, cycling ,gymnastics, gardening etc.) for at least 30 minutes per day?” The possible answers were: “yes” or ”no”. Those who answered “yes” were asked: “How often are you physically active?” There were six possible answers: “everyday”, “4-6 days

per week", "Every second or every third day per week", "once a week", "two or three times per month", "once a month or less frequent". Persons who did not admit to do any physical activities in their leisure time were cassified as "physically inactive" and asked about the reasons of sedentary lifestyle [15].

Metabolic syndrome was determined as having three out of the following five factors: (1) central obesity (WC ≥94 cm in men and ≥80 cm in women; (2) triglycerides ≥1.7 mmol/l (150 mg/dl), or specific treatment for this lipid abnormality; (3) HDL-C <1.03 mmol/l (40 mg/dl) in males, <1.29 mmol/l (50 mg/dl) in females, or specific treatment for this lipid abnormality; (4) systolic blood pressure (SBP) ≥130 mmHg or diastolic blood pressure (DBP) ≥85 mm Hg, or treatment of previously diagnosed hypertension; and (5) fasting blood glucose (FG) ≥5.6 mmol/l (100 mg/dl), or previously diagnosed and treated diabetes [13].

The study protocol was accepted by the ethical Committee of the Institute of Cardiology in Warsaw. Informed written consent was obtained from each participant.

Statistical analyses

To compare the incidence and evaluate statistical significance of the categories of quantitative characteristics in the analysed groups the chi-square test was implemented. Given that the potential correlates might differ between genders, all the analyses were performed separately for men and women. All p values were two-sided and $p<0.05$ was set as statistically significant. Statistical analyses were performed using STATISTICA Windows XP version 12.

Results

Among all 2381 adult individuals, 53.8% were women. The majority of participants were middle-aged, with secondary education, residents ofsmaller cities.

The analysis of leisure-time physical activity level revealed that the percentage of participants declaring active lifestyle on most days of week decreased between the studies in both genders (Table 1 and 2). In the studied population of women the percentage of sufficiently active persons fell from 32.5 to 28.6% ($p<0.05$). None PA increased from 33.7% 40.6% among men and from 38.6% to 44% among women ($p<0.05$). In the same time, the prevalence of those who did not exercise at all increased form 38.6% to 44% between the surveys ($p<0.05$)(Tab.1). Importantly, more than 57% of women aged >65 years old were inactive in the latest edition of the WOBASZ study which was substantially more than 10 years earlier (57.1 vs 51.2%, $p<0.05$)(data not shown).

In men, the observed changes were even more visible (Tab. 2). The percentage of subjects practicing in the exercises on most days of week decreased from 37.4 to 25.1% in ten-year observation ($p<0.001$). In the same time there was a significant increase of the percentage of sedentary men as about 40.6% in 2013-14 declared doing no exercises in their free time as compared to 33.7% ten years earlier ($p<0.01$). The fall in the percentage of physically active men was even more pronounced among young and middle-aged persons as it decreased from 38.9 to 23% between the surveys ($p<0.001$)(data not shown).

The percentage of current smokers changed substantially between the studies in both genders (Table 2 and 3). Over a decade, the percentage of adult smokers aged between 20 and 74 years significantly declined, both for men and women. An increase in the percentage of current smokers was observed only among women aged above 64 years old (2.3% vs 8.8%, WOBASZ vs WOBASZ II, respectively; $p<0.05$). The prevalence of ex-smokers increased between the surveys in both genders (30% vs 24% in men and 17.6% vs 19.6% in women, WOBASZ and WOBASZ II, respectively).

The analysis of the anthropometric characteristics showed significant changes mainly in the population of studied women. The mean values of BMI and waist circumference increased substantially between the surveys ($p<0.05$) (Table 2). The percentage of women with waist circumfe-

rence above 80 cm changed from 59.2 to 67.5 % (p<0.01). In men, waist circumference above 94 cm increased from 46.8 to 54.3% in 10-year observation (p<0.05) (Table 3).

Of other metabolic characteristics, significant changes were observed in both genders, especially in glucose concentration (p<0.001 in both men and women). Moreover the percentage of persons with elevated blood pressure increased, especially in women (p<0.001)(Table 3). The prevalence ofMetS also increased importantly, in women from 23.7 to 28.9% between the surveys (p<0.01) while in men from 31.4 to 37.8% (p<0.05) (Table 4).

Table 1. Changes in physical activity level and smoking among women participating in the WOBASZ surveys

Health behavior	Women n=1282			
	WOBASZ (2003-2005) n=873		WOBASZ II (2013-14) n=409	
	n	%	n	%
Smoking status				
Smokers	199	22.8	69	16.9*
Ex-smokers	154	17.6	80	19.6
Leisuretimephysica-lactivity				
≥ 4 days/wk	284	32.5	117	28.6*
1-3 days/wk				
0 days/wk	337	38.6	180	44.0*

*p<0.05

Table 2. Changes in physical activity level and smoking among men participating in the WOBASZ surveys

Health behaviour	Men n=1099			
	WOBASZ (2003-2005) n=784		WOBASZ II (2013-2014) n=315	
	n	%	n	%
Smoking status				
Smokers	318	40.6	100	31.8**
Ex-smokers	235	30.0	107	34.0
Leisuretimephysica-lactivity				
≥ 4 days/wk	293	37.4	79	25.1***
1-3 days/wk				
0 days/wk	264	33.7	128	40.6**

**p<0.01; ***p<0.001

Table 3. Changes in metabolic components among women in the years 2003-2014

Metabolic components	Women	
	2003-205	2013-2014
Waist circumference, cm; mean ± SD	84.9 ± 13.8	86.5 ± 13.3*
Waist circumference ≥ 80 cm; %	59.2	67.5**
Triglycerides, mg/dl; mean ± SD	115.8 ± 77.1	118.4± 66.9
Triglycerides ≥ 150 mg/dl or treatment; %	23.6	30.3
HDL-C,mg/dl; mean ± SD	59.0 ± 14.6	57.0 ± 16.9
Systolic blood pressure, mmHg, mean ± SD	127.8 ± 20.6	128.73 ± 19.0
Diastolic blood pressure, mmHg, mean ± SD	79.6 ± 9.8	81.2 ± 11.3*
BP≥130/85 mmHg or treatment, %	28.5	41.3***
Fasting blood glucose, mg/dl; mean ± SD	88.2± 28.8	97.2± 32.4***
Fasting blood glucose ≥ 100 mg/dl, %	13.6	23.5***
BP≥130/85 mmHg or treatment, %	28.5	41.3
Metabolic syndrome, %	23.7	28.9**

*p<0.05; **p<0.01; ***p<0.0001

Table 4. Changes in metabolic components among men in the years 2003-2014

Metabolic components	Men	
	2003-205	2013-2014
Waist circumference, cm; mean ± SD	94.8 ± 11.8	96.4 ± 12.1
Waist circumference ≥ 94 cm; %	50.5	55.9*
Triglycerides, mg/dl; mean ± SD	147.8 ± 125.1	143.4 ± 85.1
Triglycerides ≥ 150 mg/dl or treatment; %	33.4	38.4
HDL-C,mg/dl; mean ± SD	52.0 ± 14.9	48.2 ± 15.2***
Systolic blood pressure, mmHg, mean ± SD	132.7 ± 17.7	137.3 ± 18.6***
Diastolic blood pressure, mmHg, mean ± SD	80.7 ± 10.6	83.8 ± 11.5***
BP≥130/85 mmHg or treatment, %	35.3	41.6
Fasting blood glucose, mg/dl; mean ± SD	91.8 ± 28.8	102.6 ± 29***
Fasting blood glucose ≥ 100 mg/dl, %	18.5	36.5***
BP≥130/85 mmHg or treatment, %	35.3	41.6
Metabolic syndrome, %	31.4	37.1*

*p<0.05; **p<0.01; ***p<0.0001

Discussion

This article presents ten-year changes in lifestyle behaviors and metabolic components among adults in Poland. While analyzing the lifestyle behaviors, the most annoying results concern the substantial decline in physical activity level. A visible increase of sedentary behaviourwas observed in both genders, but the most unfavorable changes were observed in men. The disturbing trend was found also among persons active on most days of week. In the same period, most of the metabolic characteristics worsen, probably as a consequence of inappropriate lifestyle.

As compared to lifestyle trends in other countries, quite similar changes were noticed in Brazil, where the percentage of insufficiently active adults increased from 41.1% to 54% between 2002 and 2012 [6]. An increase of physical activity was observed among high-income countries such as Spain, Finland and Canada [7,8,9]. A relevant growth of physical activity was noticed in Finland between 1982 and 2012. A percentage of physical activity in leisure time increased from 21% to 33% in men and from 12% to 27% in women [20]. In the Central and Eastern Europe, only

in the Czech Republic a percentage of sufficiently active habitants was on the nicely level and exceed 46% [21]. According to the Nationwide Study of Occurrence of Risk Factors of Cardiovascular Diseases showed that over 39% of Polish subjects was physically active on most days of week [22].

Importantly, the most disturbing results of this analysis concern the highest prevalence of physical inactivity among young middle-aged men. As Poland is still a country with high premature mortality in men, these findings are of particularly significant. Several previous Polish reports showed that cardiovascular diseases are the most important contributor to overall health statistics, including premature mortality [8,23]. Thus it seems crucial to modify the risk of CVD, including physical inactivity which is one of the most recognized CVD risk factors.

While analyzing the metabolic status over the 10-year period, we observed a deterioration of most analysed characteristics. Although compared to the United States or some other westerns societies, the problem of obesity in Poland is less common [12], the distribution of body mass by the BMI category has shifted toward higher values, resulting in a relevant increase in the prevalence of obesity. According to the NCD Risk Factor Collaboration, between 1975 and 2014, the rise of the mean BMI was noticed in both genders [24]. In this study, the most statistically significant changes were found among women, especially in the context of the prevalence of obesity. Although in the whole population of studied men the mean values of anthropometric features were rather stable, the significant increase in the BMI and abdominal obesity was noticed among young and middle-aged men.

Lipid profile also changed unfavorably, mainly in triglycerides and HDL-C concentration. Interestingly, data obtained from the United States National Health and Nutrition Examination Survey showed a downward trend for median TG levels and stable HDL-C levelsin both gendersin recent years [25]. Results from National Health Surveys 1997-1999 and 2008-2011 conducted among adults in Germany demonstrated a decrease of total cholesterol by 13% in men and 12% in women and trigly-

cerides level by 14% in men and 8% in women. However, a concentration of HDL-cholesterol declined only among women. The favorable changes in total cholesterol and triglycerides levels were explained by shifts in lifestyle and use of medications [26]. The comparable findings come from northern Sweden, where a mean total cholesterol level decreased in men by 9% and in women by 13% between 1986 and 2004 [27].

As expected, the percentage of persons with elevated fasting glucose increase substantially between the surveys in both genders. Similar statistics were demonstrated by other authors, including the studies presenting the growing burden of diabetes in last decades. The systemtic review presented by Ogurtsova et al (2017) revealed that diabetes prevalence, deaths attributable to diabetes, and health expenditure due to diabetes continue to rise across the globe with important social, financial and health system implications [28].

As far as the blood pressure level is concerned, the present study showed a substantial rise in the percentage of subjects with elevated BP, especially among women. The similar results were showed by Niklas et al. (2018), who demonstrated that the prevalence of hypertension in Poland increased by 12% in the same period [29]. Contrary to Polish statistics, in Korea the prevalence of hypertension decreased over the 16-year period [30]. However, Gupta et al. (2017) showed an increasing trend in the hypertension statistics in 25-year observation of Indian adults. These findings are, to some extent, consistent with our results [31].

According to our results, the prevalence of metabolic syndrome increased significantly in Polish adults between the surveys. This finding was rather expected as the level of physical activity importantly decreased and most of metabolic characteristics worsen in the observation period. Szostak-Węgierek et al. (2017) also showed that escessive weight, especially central obesity, and othermetabolic abnormalities are common in women of childbearing age in our country [32]. Such unfavourable trends are similar in several other countries. However, Shin et al. (2018) demonstrated that MetS, although still prevalent, remained rather stable among Americans in the years 2007-2014 [33].

However, some favorable trends in health behaviours of Polish adults should be acknowledged. Over a decade, we observed a significant decrease of current smokers and an increase of former smokers in both genders. The similar trends were presented by Kaleta et al in theanalysis of Global Adult Tobacco Survey (GATS) for years 2009-2010 [34]. Although according to the world's resources, the global percentage of smokers is declining, it remains one of the most important issues of health promotion in Poland. As in other countries there are some sociodemographic groups that require special attention in the successful process of tobacco. Quitting smoking remains still difficult in particular groups, mainly less educated with lower socioeconomic status [35].

The potential limitation of the study was using self-reports to obtain information on smoking and PA patterns which can be responsible for some inaccurate data. Another important issue concerns a decrease in response rates in the second edition the WOBASZ project. However, several strengths of this study should be highlighted. Both WOBASZ surveys comprised nationally representative data based on a large number of participants. Importantly, both studies adopted consistent methodology to ensure comparable data on trends in analyzed variables.

In conclusion, it is important to highlight that most of analyzed behaviors and clinical characteristics have worsened in recent years in Poland. One of the most spectacular changes is the decline in physical activity level and the increase of obesity, glucose metabolism and other metabolic disorders. Due to still high premature mortality in Poland, caused mainly by cardiovascular diseases, it seems crucial to elaborater more effective strategies focused on active lifestyle promotions as well as prevention of metabolic syndrome.

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Nutritional Habits of the 50+ Population with Cardiovascular Diseases

Izabela Gąska[1]

Katarzyna Sygit[2]
https://orcid.org/0000-0001-7173-2266

Elżbieta Cipora[1]

Marian Sygit[2]
https://orcid.org/0000-0002-7902-7761

Jan Krakowiak[3]
https://orcid.org/0000-0002-3435-9658

[1] Jan Grodek State Vocational Academy in Sanok, Poland
[2] State Vocational Academy in Kalisz, Poland
[3] Medical University of Lodz, Poland

Address for correspondence

Katarzyna Sygit
State Vocational Academy in Kalisz
4 Nowy Świat Str., 62-800 Kalisz, Poland
e-mail: ksygit@poczta.onet.pl

Abstract

Introduction: *Cardiovascular diseases are the leading cause of death in Poland and worldwide. The main factors of cardiovascular disease are improper diet, obesity, and lack of physical activity. According to numerous specialists, effective prevention (particularly focused on the principles of proper nutrition) reduces the incidence by as much as 80%.*

Objective: *The aim of this paper is the assessment of nutrition habits of the 50+ population with cardiovascular diseases.*

Materials and methods: *The study was carried out among 411 individuals aged over 50 with cardiovascular diseases. The method used in the study was a diagnostic survey. The study involves: authors' questionnaire, and Inventory of Health-Related Behavior (IHB). A detailed statistical analysis was carried out in the R program, version 3.5.1.*

Results: *As a result of the conducted research, it was found that 38.20% of subjects were overweight, while 30.41% suffered from class 1 obesity. It was found that 69.10% ate 4-5 meals per day. Interestingly, breakfast was consumed by 92.21% of subjects, lunch by 98.05%, and dinner by 90.27%. The respondents relatively often snacked between meals (67.64%). It was found that vegetables were consumed usually once a day by 74.70% of subjects, while fruit by 32.85%; often the respondents chose, however, sweets and fast-food. The analysis of the study results (according to the IHB Questionnaire) showed that correct nutrition habits were the least common amongst subjects. Statistical relationships were found between health behaviours in each of the areas studied (including proper eating habits) and gender, age and Body Mass Index (BMI) of respondents.*

Conclusions: *Subjects displayed correct eating habits in terms of frequency and number of meals. However, subjects often chose unhealthy products and snacked between meals. The analysis of the study results (according to the IHB*

Questionnaire) showed that correct nutrition habits were the least common amongst subjects.

Key words: *nutrition, health behaviours, cardiovascular diseases, people aged 50+.*

Introduction

Key health behaviours include, above all, rational nutrition and: physical activity, avoidance of psychoactive substances and personal hygiene [1,2,3,4].

An important manifestation of healthy behaviours is healthy nutrition, as per recommendations of nutritionists, which takes into account genetic, social and cultural conditions [5.6.7]. Proper nutrition is necessary for good health, proper development, physical fitness, intellectual development, as well as general well-being. Food must be matched to the actual needs of the body, taking into account age, gender, physiological condition and the type of work performed by an individual [1,5,6].

Proper nutrition is particularly important for patients with diagnosed cardiovascular diseases because it constitutes a part of the treatment and prevention [7]. Cardiovascular diseases (CVD) are the leading cause of death in Poland and worldwide. [8,9] They include: diseases of the brain, peripheral vessels, and heart vessels; they are usually caused by atherosclerosis of blood vessels. The main factors of CVD are improper diet, obesity, and lack of physical activity. According to numerous specialists, effective prevention (particularly focused on the principles of proper nutrition) reduces the incidence of CVD by as much as 80% [7,10,11].

The first method of treatment in the strategy of CVD therapy is a change in lifestyle, including a balanced diet, increased physical activity, and quitting smoking [11,12,13]. Non-pharmacological methods of CVD treatment are very safe, but are underestimated. Additionally, they are considered inefficient, because patients must follow dietary recommendations. Meanwhile, difficulties in implementing lifestyle recommendations result from the lack of systemic solutions in the treatment of cardiology patients. Increasingly often planners of diet-therapy take into account ethnic, socioeconomic and cultural factors. Hence, there is a need for creating therapeutic teams which would include a dietitian in addition to medical professionals [7,11,14,15,16].

Specialists propose an interdisciplinary approach to the treatment of cardiovascular diseases wherein the dietitian responsible for planning and monitoring dietary treatment would play a significant role [7,11,17].

The aim of this paper is the assessment of nutrition habits of the 50+ population with cardiovascular diseases.

Materials and methods

The research was carried out in 2018 among 411 individuals aged 50+ with cardiovascular disease. The method used in the study was a diagnostic survey. The research tools used in the study were: authors' survey questionnaire prepared for the purposes of this study. The survey questionnaire consisted of three parts. The first part concerned social information, the second part - health of the subjects, and the third - their lifestyle. The second tool was the Inventory of Health-Related Behavior (IHB) by Z. Juczyński [18]. The questionnaire consists of 24 statements describing various types of health-related behaviours. It helps determine the intensity of behaviours in four different health categories: eating habits, preventive behaviours, positive mental attitude, and health practices. The study was approved by the Bioethics Committee of the Medical University of Lodz, under number RNN/156/18/KE.

A statistical analysis was carried out in the R program, version 3.5.1.

The analysis of quantitative variables (i.e. expressed in numbers) was performed by calculating the mean, standard deviation, median, quartiles, minimum and maximum values. The analysis of qualitative variables (i.e. not expressed in numbers) was performed by calculating the number and percentage of occurrences of each value.

The comparison of the values of quantitative variables in two groups was made using the Student's t test (when the variable had normal distribution in these groups) or the Mann-Whitney test (otherwise).

The comparison of quantitative variable values in three or more groups was performed by ANOVA analysis of variance (when the variable had normal distribution in these groups) or Kruskal-Wallis test (otherwi-

se). After detecting statistically significant differences, post-hoc analysis was carried out with Fisher's LSD test (normal distribution) or Dunn's test (non-normal distribution) to identify statistically significant differences between groups.

Correlations between quantitative variables were analyzed using the Pearson correlation coefficient (when both variables had normal distribution) or Spearman correlation coefficient (otherwise) [19].

Results

The overview of the subjects

Men dominated in the subject group – there were 223 men (54.26%) and 186 women (45.26%); 2 people (0.49%) did not provide gender information (Table 1).

Table 1. Subjects' gender

Gender	N	%
Women	186	45.26%
Men	223	54.26%
No answer	2	0.49%

The age structure of the subjects was as follows: the average age of the subjects was 69.2 (SD=9.45 and ranged from 50 to 93); the median was 69. The first and third quartiles were 62 and 76, respectively, hence the group in the study group was dominated by people aged 62-76 (Table 2).

Table 2. Subjects' age

Age [in years]							
N	Mean	SD	Median	Min	Max	Q1	Q3
411	69.2	9.45	69	50	93	62	76

As a result of the conducted research, it was found that 157 subjects (38.20%) were overweight, 125 (30.41%) suffered from class 1 obesity, and 100 individuals (24.33%) had correct body mass. Worryingly, 15 persons (3.65%) suffered from class 2 obesity, and further 8 persons (1.95%) had class 3 obesity (Table 3).

Table 3. Subjects' BMI (body mass index)

BMI		n	%
17 – 18.5	Underweight	2	0.49%
18.5 – 25	Correct weight	100	24.33%
25 – 30	Overweight	157	38.20%
30 – 35	Obesity	125	30.41%
35 – 40	Class 2 obesity	15	3.65%
> 40	Class 3 obesity	8	1.95%
No data available (weight and/or height)		4	0.97%

Nutritional behaviours

Rational, proper nutrition is an important factor that conditions human health. The study found that 284 subjects (69.10%) ate 4-5 meals a day, 82 individuals (19.95%) ate 3 meals a day, 19 persons (4.62%) had fewer than 3 meals per day, while 13 people (3.16%) consumed more than 5 meals per day; 3.16% of subjects did not respond (Table 4).

Table 4. Number of respondents' daily meals

Number of daily meals	n	%
More than 5 meals	13	3.16%
4-5 meals	284	69.10%
3 meals	82	19.95%
Fewer than 3 meals	19	4.62%
No answer	13	3.16%

The frequency of daily meals was also analyzed. Interestingly, breakfast was consumed by 379 subjects (92.21%), second breakfast by 171 respondents (41.61%), dinner by 403 individuals (98.05%), afternoon tea by 115 persons (27.98%) and supper by 371 (90.27%). The respondents also reported infrequent consumption of some meals: 108 subjects ate second breakfast several times a week (26.28%), 100 individuals had afternoon tea once a week or less (24.33%), and 103 people never had afternoon tea (25.06%) (Table 5).

In terms of places where the meals were eaten, it was found that the most common place was the family home: breakfast was consumed at home by 393 people (95.62%), second breakfast by 229 respondents (55.72%), dinner by 405 people (98.54%), afternoon tea by 156 subjects (37.96%) and supper by 386 people (93.92%). The respondents also declared having afternoon tea with relatives – 112 people (27.25%) and second breakfast in other places – 83 people (20.19%) (Table 6).

According to the analysis, respondents also faced the problem of snacking: large proportion of subjects snacked between meals – 278 people (67.64%), while only 130 people (31.63%) did not (Table 7).

Providing the body with nutrients such as proteins, fats, carbohydrates, vitamins and minerals is the foundation of proper nutrition. It was found that vegetables were usually consumed once a day by 307 people (74.70%), fruits were also consumed mostly once a day by 135 people (32.85%), fish were consumed once a week by 206 people (50.12 %), poultry several times a week by 225 people (54.74%), cereal products were consumed several times a day by 149 people (36.25%), sweets were consumed quite often: from several times a week – by 92 people (22.38 %) – up to once a month: by 11 people (2.68%) (Table 8).

Table 5. Frequency of specific daily meals consumed by respondents

	Every day	Several times a week	Once a week or less	Once a month or less	Never	No answer
Breakfast	379 (92.21%)	13 (3.16%)	3 (0.73%)	1 (0.24%)	14 (3.41%)	1 (0.24%)
Second breakfast	171 (41.61%)	108 (26.28%)	32 (7.79%)	11 (2.68%)	82 (19.95%)	7 (1.70%)
Dinner	403 (98.05%)	7 (1.70%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	1 (0.24%)
Afternoon tea	115 (27.98%)	71 (17.27%)	100 (24.33%)	14 (3.41%)	103 (25.06%)	8 (1.95%)
Supper	371 (90.27%)	17 (4.14%)	4 (0.97%)	2 (0.49%)	16 (3.89%)	1 (0.24%)

Table 6. Place of meal consumption

	At home	At immediate family	In bars, restaurants	In other places	I do not eat	No answer
Breakfast	393 (95.62%)	0 (0.00%)	0 (0.00%)	2 (0.49%)	16 (3.89%)	0 (0.00%)
Second breakfast	229 (55.72%)	4 (0.97%)	2 (0.49%)	83 (20.19%)	83 (20.19%)	10 (2.43%)
Dinner	405 (98.54%)	0 (0.00%)	3 (0.73%)	3 (0.73%)	0 (0.00%)	0 (0.00%)
Afternoon tea	156 (37.96%)	112 (27.25%)	2 (0.49%)	27 (6.57%)	101 (24.57%)	13 (3.16%)
Supper	386 (93.92%)	1 (0.24%)	0 (0.00%)	4 (0.97%)	20 (4.87%)	0 (0.00%)

Table 7. Snacking between meals by respondents

Snacking between meals	n	%
Yes	278	67.64%
No	130	31.63%
No answer	3	0.73%

Table 8. Consumption of specific food products by respondents

	Several times per day	Once a day	Once a week	Several times a week	Once a month	Several times a month	I do not eat	No answer
Vegetables	42 (10.22%)	307 (74.70%)	25 (6.08%)	33 (8.03%)	1 (0.24%)	0 (0.00%)	2 (0.49%)	1 (0.24%)
Fruit	128 (31.14%)	135 (32.85%)	80 (19.46%)	33 (8.03%)	29 (7.06%)	0 (0.00%)	5 (1.22%)	1 (0.24%)
Fish	0 (0.00%)	1 (0.24%)	206 (50.12%)	21 (5.11%)	97 (23.60%)	1 (0.24%)	85 (20.68%)	0 (0.00%)
Poultry	0 (0.00%)	2 (0.49%)	147 (35.77%)	225 (54.74%)	21 (5.11%)	4 (0.97%)	11 (2.68%)	1 (0.24%)
Beef/ Pork	0 (0.00%)	0 (0.00%)	174 (42.34%)	142 (34.55%)	41 (9.98%)	20 (4.87%)	33 (8.03%)	1 (0.24%)
Cereals	149 (36.25%)	46 (11.19%)	142 (34.55%)	66 (16.06%)	3 (0.73%)	1 (0.24%)	0 (0.00%)	4 (0.97%)
Dairy products	75 (18.25%)	283 (68.86%)	19 (4.62%)	22 (5.35%)	0 (0.00%)	2 (0.49%)	8 (1.95%)	2 (0.49%)
Sweets	92 (22.38%)	64 (15.57%)	22 (5.35%)	78 (18.98%)	111 (27.01%)	11 (2.68%)	31 (7.54%)	2 (0.49%)
Fast food	2 (0.49%)	0 (0.00%)	6 (1.46%)	3 (0.73%)	77 (18.73%)	41 (9.98%)	281 (68.37%)	1 (0.24%)

Results analysis using the Inventory of Health-Related Behavior (IHB)

The analysis of the study results showed that amongst subjects the most common health behaviours were related to health practices, slightly less common in the area of positive mental attitude and the least common in the area of proper eating habits and preventive behaviours (Table 9).

Table 9. Degree of intensity of specific categories of health behaviours according to IHB amongst respondents

IHB sub-scales	N	Mean	SD	Median	Min	Max	Q1	Q3
Correct eating habits	411	3.28	0.75	3.17	1	5	2.83	4
Preventive behaviours	411	3	0.62	3	1.17	4.5	2.67	3.67
Positive mental attitude	411	3.59	0.52	3.83	1.33	4.67	3.33	4
Health practices	411	3.61	0.53	3.67	1.67	4.83	3.33	4

The analysis of research results showed that age correlated significantly and positively with health practices ($p<0.05$). The group of elderly subjects had a greater intensity of health practices (Table 10).

Table 10. Categories of health behaviours according to IHB versus respondents' age

IHB	Correlation with age			
	Correlation coefficient	p *	Dependency direction	Strength of dependence
Correct eating habits	-0.089	p=0.07 NP	---	---
Preventive behaviours	-0.057	p=0.253 NP	---	---
Positive mental attitude	0.045	p=0.366 NP	---	---
Health practices	0.251	p<0.001 NP	positive	very weak

* P = Normal distribution of both correlated variables, Pearson correlation coefficient; NP = No normal distribution of at least one of the correlated variables, Spearman's correlation coefficient

Statistical relationships were found between health behaviours in each of the areas studied and gender ($p<0.05$). Women displayed more intense behaviours in each area than men (Table 11).

Table 11. Categories of health behaviours according to IHB versus respondents' gender

IHB		Women	Men	p *
Correct eating habits	mean ± SD	3.59±0.63	3.03±0.74	<0.001
	median	3.83	3	NP
	quartiles	3-4	2.67-3.67	
Preventive behaviours	mean ± SD	3.25±0.57	2.79±0.59	<0.001
	median	3.33	2.83	NP
	quartiles	2.83-3.67	2.5-3.08	
Positive mental attitude	mean ± SD	3.7±0.5	3.5±0.52	<0.001
	median	4	3.67	NP
	quartiles	3.5-4	3.17-3.83	
Health practices	mean ± SD	3.81±0.43	3.44±0.54	<0.001
	median	4	3.5	NP.
	quartiles	3.67-4	3.08-3.83	

* P = Normal distribution in groups, Student's t-test; NP = No normal distribution in groups, Mann-Whitney test

As a result of the research analysis, it was found that health behaviours in each area significantly depended on the body mass index BMI ($p<0.05$). Overweight subjects had less intense behaviours than regular-weighing patients in each area. Obese subjects had the least intense behaviours in all areas (Table 12).

Table 12. Categories of health behaviours according to IHB versus respondents' BMI

IHB		Underweight, correct weight	Overweight	Obesity	p *
Correct eating habits	mean ± SD	3.52±0.75	3.42±0.74	2.96±0.63	<0.001
	median	4	3.67	3	NP.
	quartiles	3-4	3-4	2.83-3	Under-Norm.Over>0
Preventive behaviours	mean ± SD	3.13±0.69	3.09±0.63	2.8±0.51	<0.001
	median	3.33	3	2.83	NP.
	quartiles	2.54-3.67	2.67-3.67	2.67-3	Under-Norm.Over>0
Positive mental attitude	mean ± SD	3.67±0.49	3.6±0.56	3.52±0.48	<0.001
	median	4	3.83	3.67	NP.
	quartiles	3.33-4	3.33-4	3.17-3.83	Under-Norm.Over>0
Health practices	mean ± SD	3.77±0.53	3.62±0.53	3.47±0.49	0.001
	median	4	3.83	3.5	NP.
	quartiles	3.67-4	3.33-4	3.17-3.83	Under-Norm.Over>0

* P = Normal distribution in groups, ANOVA + results of post-hoc analysis (Fisher's LSD test); NP = No normal distribution in groups, Kruskal-Wallis test + post-hoc analysis results (Dunn's test)

Discussion

Despite the growing research interest on health behaviours among 50+ population, there is a need for continuous monitoring [10,20,21,22]. Scientific research is the basis for determining and predicting the types of needs and methods of achieving goals that are part of public health and social services [11]. Hence, the presented study aimed at presenting health behaviours of the 50+ population with cardiovascular diseases and determining relations between socio-demographic factors and nutritional habits of the population. This allows for an in-depth analysis of the implementation of actions aimed at improving the health of the population.

Nutrition experts emphasize the fact that regular nutrition is important for health, so one should eat at least 5 meals a day: 3 main meals and 2 light meals [5,6,23,24]. It has been shown that respondents ate regularly. Most of them ate between 4 and 5 meals per day (69.10%). The results of the research by Duda et al. confirm this regularity and indicate that the eating behaviours of Poles had been relatively stable for sixteen years and the fluctuations were small [11]. Most (81%) of the respondents said they were eating properly. Regular consumption of at least three meals a day was also shown by a study conducted in 2016 by Mossakowska [21]. The frequency of daily meals was also analyzed in authors' own studies. Breakfast is the first and most important meal of the day; it improves the quality of nutrition and cognitive abilities, helps obtain better results at work and improves functioning throughout the day. In authors' own research, the vast majority (92.21%) of subjects consumed breakfast every day. Almost identical results were obtained in a report *Od jedzenia humor się zmienia [Food changes your mood]*, where 93% of respondents reported eating breakfast daily. The consumption of the other two main meals, i.e. dinner and supper, had a similar percentage value. This applies to both authors' own research and research from 2011 and 2016 [11,21]. Worse results were observed among older population, aged 65+. In the study by M. Bąk-Sosnowska, 69.1% of subjects declared daily breakfast consumption [13].

The obtained data on height and weight also allowed for characterizing the subjects in terms of their nutritional status. Positive evaluation of eating behaviours presented above in terms of regularity of basic meals, was not confirmed, however, by their BMI. This indicates a high prevalence of anomalies in adult nutrition in terms of nutritional recommendations. Normal BMI values, i.e. between 18.5 and 25, were displayed by 24.33% of the entire study population. Overweight was faced by 38.2% of subjects, while 30.41% of respondents had class 1 obesity. Class 2 obesity was observed in 3.65% of subjects, whereas class 3 obesity in 1.95%. Similar results were obtained by M. Bąk-Sosnowska [13] and W. Kulpa [22]. Worryingly, a vast majority of respondents did not notice the relationship between their health and body weight (54.74%). Only 10.95% acknowledged the relationship between these factors, and 18.49% were aware that their health was affected by overweight and obesity. In the research by M. Cybulski et al. overweight and obesity occurred in almost 75% of the respondents, who considered their diet as 'correct' [4]. Similar results were obtained by M. Tańska et al., where as many as 81.3% of subjects with normative body weight, 89.0% of overweight individuals and 85.0% obese ones declared that they followed a low-fat diet [24]. It can therefore be assumed that the declared attitudes translate into specific behaviours only to a small extent.

The application of the IHB questionnaire helped determine the intensity of correct eating habits among the studied population of people aged 50+ [25]. Authors' own studies showed that correct nutrition habits were the least common amongst subjects. Better results were obtained in this area by E. Smolen et al., where a positive correlation between correct eating habits and age was revealed [26]. Obese subjects had the least intense behaviours in terms of proper eating habits. On the other hand, relatively high levels of correct eating habits were observed among Medicine students. In the studies by A. Baran and A. Stocka, this high level was obtained by 48.3% of respondents [27], while worse results were obtained by Baumgart et al. [28].

Overweight and obesity are currently a serious social problem and a risk factor for cardiovascular diseases [7,13,20]. It is especially dan-

gerous for people with recorded levels of overweight and obesity and it indicates the need to assess the amount of food they eat, including energy supply [7]. The health effects of the obesity epidemic result not only from this disease, but also from the consequences of diseases for which obesity is a proven risk factor. According to numerous studies, the risk of myocardial infarction is doubled for people with a BMI above 30 [7,12,13,29]. Authors' own research shows that 36.01% of respondents belong to this group. Research conducted in 2016 by S. Zanjani showed that only 48% of respondents improved health by proper nutrition, such as frequent consumption of vegetables and fruits, and reduction of animal fats [7]. In authors' own research, it was found that 74.70% of the respondents consumed vegetables only once a day and only 31.14% reported eating fruit several times a day. In the light of research by H. Hung et al. it may be stated that adults consumed fruit and vegetables even less frequently. This was especially true for men. Only every second adult man ate both fruit and vegetables (other than potatoes) every day, while for women it was almost 2/3. Better results were observed among children over 6 months of age. Almost 62% of children ate vegetables at least once a day [2]. These results are comparable to those obtained in authors' own research. 73% of the surveyed children consumed fruit once a day or more often. Generally, children under 15 years of age consumed fruit more often than vegetables. It is worrying that nearly 4% of children did not eat vegetables at all or less than once a week [2,7]. In authors' own research, 50.12% of subjects ate fish once a week, while meat products – poultry – were consumed several times a week, which is a a product containing saturated fatty acids (54.74%). Worryingly, more than half of Poles (57%) believed that their meals were similar to those of their parents [1,5,23]. This may suggest that current anomalies in adult eating habits will be reproduced in future generations. In this situation, it is necessary to intensify health-promoting activities, especially through activities promoting proper nutritional habits. Nurses and doctors, as well as persons cooperating with them, should play an important role, as they have daily contact with patients. It is also worth implementing preventive programs,

because even a slight improvement of modified risk factors may lead to a significant reduction of cardiovascular incidents [1,13,7,21,29,30].

Conclusions

1. Most respondents ate rationally. The subjects consumed between
2. 3 and 5 meals daily; main meals were: breakfast, dinner and supper.
3. A high frequency of snacking between meals was revealed. Most of the respondents chose unhealthy snacks / products, such as sweets or fast food.
4. Analysis of the research according to the IHB Questionnaire showed that:
    - health behaviours in the area of proper eating habits were the least intense;
    - statistical relationships were found between health behaviours in each of the areas studied (including proper eating habits) and gender, age and BMI of the subjects.

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Prevalence of Smoking among Pregnant Women

Piotr Wojtysiak[1]

Justyna Zajdel-Całkowska[2]

Michał Szulc[1]

Dorota Kaleta[1]

[1] Department of Hygiene and Health Promotion, Medical Unversity of Lodz, Poland

[2] Faculty of Law and Administration, Lazarski University in Warsaw, Poland

Address for correspondence

Dorota Kaleta
Department of Hygiene and Health Promotion, Medical University of Lodz
7/9 Żeligowskiego Str., 90-752 Lodz, Poland
e-mail: dorota.kaleta@umed.lodz.pl

Abstract

Introduction: *It is estimated that smoking is the cause of the premature death of about 6 million people worldwide, each year. Although smoking rates among pregnant women in the Western world have fallen in recent years, smoking remains the leading cause of neonatal deaths, premature births and low birth weight.*

Aim: *The aim of the study was to assess the prevalence of active and passive smoking among pregnant women.*

Material and methods: *A cross-sectional study was conducted among pregnant women receiving antenatal care at the Poviat Health Care Complex in Piotrków Trybunalski in 2018. The research tool was a questionnaire. The study design received a positive opinion of the Bioethics Committee at the Medical University of Lodz RNN/386/17/EC of December 19, 2017 and the consent of the head of this unit.*

Results: *600 pregnant women participated in the study, the response rate was 45.2%. 47% of respondents have ever smoked, 52% have never smoked, 20% of women smoked tobacco during pregnancy, 15.2% of women quit smoking when they got pregnant, 15% reduced the number of cigarettes, and 5% continued smoking. Over 35% of respondents were exposed to secondhand smoke, most often at home. Passive exposure to tobacco smoke was significantly associated with factors such as respondent smoking status, education, employment, living with a smoking partner and monthly income per family member.*

Conclusions: *Smoking by pregnant women as well as exposure to secondhand smoke is still a significant problem. Women at high risk of returning to smoking before or during pregnancy can be identified as requiring more support for stopping smoking. Knowledge of smoking patterns among women before conception, during pregnancy and after birth can help improve smoking cessation interventions.*

Key words: *maternal smoking, secondhand smoke, pregnancy, socioeconomic status*

Introduction

Smoking is the inhalation of tobacco smoke in the mouth, and usually of the lungs, as well [1]. It is estimated that smoking is the cause of the premature death of about 6 million people worldwide, each year [2]. „Premature death caused by smoking" is defined as death from a smoking-related illness in a person who would otherwise have died later due to another cause. On average, these premature deaths cause 10 lost years of life [3]. Smoking affects every element involved in the reproductive process. This statement confirms a systematic review of the scientific literature on the impact of cigarette smoking and smoke constituents on various stages of reproduction [4]. It was found that „all stages of the reproductive process are the target for toxic cigarette smoke" [5]. An American study published by Centers for Disease Control and Prevention found that although smoking rates among pregnant women in the Western world have decreased in recent years, smoking remains the leading cause of neonatal deaths, premature births and low birth weight [6]. Researchers have found that smoking was associated with:

- 5-8% of premature births,
- 13-19% of low birth weight cases (with normal pregnancy duration),
- 5-7% of deaths related to prematurity,
- 23-34% of deaths due to sudden infant death syndrome (cot death).

Smoking is a major risk factor for low birth weight and small for gestational age (SGA) [7]. Studies in Sweden have shown that children born by women who smoked during pregnancy are on average 162-226 grams lighter than children born by non-smoking mothers. In Spanish studies, the difference was 216 grams [8]. Other studies have found that smoking during pregnancy can lead to slower fetal head growth and smaller head circumference after birth [61-63]. The results of the West Midlands study showed that „children born by women who smoke during pregnancy are approximately 40% more likely to die in the first four weeks of life than children born to non-smokers" [9]. It is estimated that more than

a quarter of sudden infant deaths (cot death) is caused by smoking during pregnancy and exposure to secondhand smoke, especially at home [10]. The risk of cot death is three times higher in infants whose mothers smoke both during and after pregnancy. One possible explanation is that nicotine and its derivatives found in tobacco smoke easily reach the fetal cerebrospinal fluid, causing damage to the lining (the layer forming the protective barrier and the filtration system separating the brain from the cerebrospinal fluid) [11]. Smoking by the mother negatively affects the offspring from infancy to childhood and even adulthood. Babies and children of parents who smoke are twice as likely to suffer from a severe respiratory infection as non-smokers. Smoking during pregnancy may also increase the risk of asthma and wheezing in young children [12].

Results

A cross-sectional study was conducted among 600 pregnant women receiving antenatal care at the Poviat Health Care Center in Piotrków Trybunalski in 2018 – the participation rate was 45.2%. The detailed characteristics of the subjects are given in Table 1. It was observed that 47% of the subjects ever smoked and 52% never smoked. Nearly 20% of women smoked tobacco during pregnancy (Table 2), 15.2% of women quit when they became pregnant, 15% of smokers reduced the number of cigarettes, 5% continued smoking. Smokers have made an average of 1.5 attempts to stop smoking in the last 12 months and 1 attempt during pregnancy (Table 3). The average age of onset of smoking was 16.5 ± 2.3 years. The average number of cigarettes smoked per day before pregnancy was 13.6 ± 5.9 and during pregnancy 10.9 ± 5.6 (Table 4). 63.8% of respondents smoked their first cigarette within 30 minutes of waking up. 95% of pregnant women were asked by the doctor if they had smoked tobacco in the last 12 months, 97.5% of smokers were advised to quit smoking completely, and 2.6% to reduce the number of cigarettes. 87.4% of pregnant smokers said they want to quit smoking. Women who smoked have made more than one (1.5 on average) attempt to stop smoking in the last

12 months, and one attempt since pregnancy. The results of the study showed that significant barriers to stop smoking during pregnancy were: over 35 years of age, unemployment, smoking by a partner, low monthly income per family member, lack of awareness of the negative impact of smoking on adult and fetal health and passive exposure to tobacco smoke. In the multifactorial model, it was found that the risk of smoking was ever higher in women with primary and secondary education compared to women with higher education (OR = 2.59, 95% CI: 1.16-6.23, respectively; p <0,05 and OR = 3.75; 95% CI: 1.73-8.14; p <0.001). The risk of smoking was also significantly higher in the group of unemployed compared to the employed OR = 14.22, 95% CI: 3.73-54.26, p <0.001). In addition, not being in a formal relationship was associated with the risk of ever smoking OR = 3.06; 95% CI: 1.72-5.46; p <0.001 (married vs. single, widow, divorced). No concern about the harmful effects of smoking on maternal and fetal health was also significantly associated with ever smoking OR = 2.94, respectively; 95% CI: 1.84-4.71 p <0.001 and 1.89; 95% CI: 1.20-2.99 p <0.01. The risk was also higher for women in the first trimester of pregnancy compared to respondents in the third trimester and among those who did not have children vs. already having children. Exposure to secondhand smoke has been correlated with ever smoking and has been associated with hours of exposure to tobacco smoke, OR from 2.27, p<0.01 for exposure not exceeding one hour per day to 20.63 p <0.001 for exposure between 5 and 8 hours per day. The odds ratio (OR) and 95% confidence intervals (CI) for continuing smoking in pregnancy showed that respondents aged 35-44 are much more likely to continue smoking despite pregnancy than women aged 19-25 (OR = 2.67, 95% CI: 1.06-6.32, p <0.05). The unemployed were characterized by a significantly higher risk of continuing smoking during pregnancy compared to employees (OR = 2.05, 95% CI: 1.14-3.67, p <0.05). Singles, widows, divorced also had a higher risk of continuing smoking compared to married women (OR = 2.32, 95% CI: 1.34-4.03, p <0.01). A statistically significant relationship was found between continuing smoking during pregnancy and smoking by a partner compared to non-smokers (OR = 1.89, 95% CI:

1.27-6.25, p <0.001) (Table 6). Women declaring a very low monthly income per family member (PLN 700 / month) had a five-fold higher risk of continuing smoking compared to pregnant women with incomes exceeding PLN 2000 / month (OR = 5.33, 95% CI: 4.12-43,14) , p <0.001). Women who were not concerned about the harmfulness of smoking for their and the fetus's health were significantly more likely to continue smoking during pregnancy compared to the group expressing concern OR = 6.76, 95% CI, respectively: 3.53-12.93, p <0.001 and OR = 8.93, 95% CI: 4.45-17.90, p <0.001. Having children was associated with an increased risk of continuing smoking compared to not having children OR = 6.34, 95% CI: 3.74-10.77, p <0.001. In addition, a relationship between total daily exposure to secondhand smoke (vs no exposure) and continued smoking during pregnancy (OR = 9.88, 95% CI: 5.60-17.43, p <0.05) was observed. In the group of neonates of smoking mothers, the birth weight of newborns was 3193.7 ± 578.1 g and was significantly lower than the body weight of newborns of non-smoking mothers 3402.0 ± 458.8 g (p <0.05). The birth weight of newborns of mothers passively exposed to smoking was also statistically significantly lower than those born by non-smoking women 3209.6 ± 400.1 g vs. 3402.0 ± 458.8 g (p <0.05). Similarly, in the group of newborns born by women who smoke, body length was significantly smaller than that of newborns of mothers from non-smoking women 53.7 ± 3.8 vs. 56.3 ± 2.6cm (p <0.001). The head circumference of newborns born by smoking women was significantly smaller than that of newborns born by non-smoking women 33.1 ± 2.3 vs. 34.6 ± 1.5cm (p <0.001). Among newborns born by women who smoked, the chest circumference was significantly smaller than those of newborns who were born by non-smoking mothers 32.0 ± 2.4 vs. 33.4 ± 2.1 (p <0.01).

Table 1. Characteristics of the study population (n = 600)

Characteristic		N	%
Age in years			
	min-max average median	19-41 26 5,6	
	<19	10	1,7
	20-24	120	20,0
	25-29	243	40,5
	30-34	159	26,5
	35-39	65	10,8
	40-44	3	0,5
	45+	0	0,0
Week of pregnancy at the time of the study		$\bar{x}$ 31,5; median 35,0 SD 9,5	
Trimester of pregnancy			
	I trimester	32	2,0
	II trimester	128	15,9
	III trimester	440	82,1
Education			
	Basic	129	21,5
	Professional	153	25,5
	Average	231	38,5
	Higher	87	14,5
Currently pregnancy			
	1	270	45,0
	2	210	35,0
	3	85	14,2
	4	20	3,3
	5	10	1,7
	6	5	0,8
Delivery			
	one delivery	270	45,0
	many deliveries	330	55,0
Number of deliveries			

	0	270	45,0
	1	245	40,8
	2	60	10,0
	3	15	2,5
	4	5	0,8
	5	5	0,8
Employment			
	employed	465	77,5
	unemployed	35	5,8
	other	90	15,0
	no answer	10	1,7
Type of work			
	physical work (predominance of physical effort)	180	38,7
	intellectual work (predominance of mental effort)	285	61,3
	Marital status		
	married	474	79,0
	single	117	19,5
	widow / divorced	9	1,5
Living with a partner			
	Yes	562	93,7
	No	38	6,3
Subjective income assessment „makes ends meet”			
	with great difficulty	0	0,0
	with difficulty	25	4,2
	with some difficulty	248	41,3
	fairly easy	206	34,3
	easily	88	14,7
	very easy	33	5,5
Monthly Income			
	up to PLN 500	20	3,3
	over 500 to 700 PLN	49	8,2
	over 700 to 1000 PLN	213	35,5
	over 1000 to 1500 PLN	188	31,3
	over PLN 1500 to 2000	86	14,3
	over PLN 2000 to PLN 2500	17	2,8
	over 2500 PLN	27	4,5
Subjective assessment of healthy state			

	very good	245	40,8
	good	275	45,8
	neither good nor bad	70	11,7
	bad	5	0,8
	very bad	5	0,8
Family help and support			
	at all	30	5,0
	sometimes	110	18,3
	often	85	14,2
	always	375	62,5

Table 2. Smoking status of pregnant women (N = 600)

Answer	N	%
I have never smoked or smoked less than 100 cigarettes	316	52,8
in all life	74	12,2
I stopped smoking before I found out I was pregnant and I haven't smoked yet	91	15,0
I stopped smoking after I got pregnant and I still don't smoke	90	15,0
I smoke cigarettes regularly, but I reduced their number after I got pregnant	29	5,0

Table 3. Characteristics of regular smokers (N = 119)

Answer	N	%
Time from waking up to reaching for a cigarette within 5 minutes	33	27,7
After 6-30 minutes	43	36,1
After half an hour to an hour	41	34,5
You can persist without smoking for up to an hour	2	1,7
Number of highly addicted to nicotine		63,8
Intentions regarding smoking „I don't want to stop smoking"	5	4,2
„I think I should stop smoking but I really don't want to"	10	8,4
„I want to stop smoking but I haven't thought about when I could do it"	11	9,2
„I REALLY want to stop smoking but I don't know when I'll do it"	5	4,2
„I want to stop smoking and hope to do so soon"	4	3,4
„I REALLY want to stop smoking and I'm going to do it in 3 months"	4	3,4
„I REALLY want to stop smoking and I'm going to do it in a month"	80	67,2
I want to stop smoking		87,4
Number of attempts to stop smoking in the last 12 months (82 women / 68.9% / attempted to stop smoking)	Average 1,4	±SD 0,5
Number of attempts to stop smoking since learning about pregnancy (82 women / 68.9% / attempted to stop smoking)	Average 1,1	±SD 0,3
Age of onset of smoking	16,5	2,3

Table 4. Pregnant declarations regarding smoking (N = 284)

Answer	Average	±SD
During the 3 months before you got pregnant, how many cigarettes did you smoke each day? (average) (n subjects = 284)	13,6	5,9
How many cigarettes do you smoke today? (average) (n subjects = 119)	10,9	5,6

Table 5. Odds Ratios (OR) and 95% Confidence Intervals (CI) for ever smoking in the study group (N = 600) depending on selected characteristics

Characteristic	N	Ever smoking N = 284 (47,2%)		Univariate logistic regression		Multivariate logistic regression a	
		n	%	OR	95%CI	OR	95%CI
Age (years)							
19-24	130 (21,7)	84	64,6	2,77***	1,51-5,08	1,68	0,70-4,00
25-29	243 (40,5)	105	43,2	1,16	0,67-2,00	1,13	0,50-2,57
30-34	159 (26,5)	68	42,8	1,13	0,63-2,03	1,91	0,82-4,45
35-44	68 (11,3)	27	39,7	1.00	reference	1.00	reference
Education							
basic	129 (21,5)	45	34,9	2,21*	1,16-4,20	1,31	0,73-3,53
professional	153 (25,5)	84	54,9	5,01***	2,70-9,32	2,59*	1,16-6,23
secondary	231 (38,5)	138	59,7	6,11***	3,37-11,06	3,75***	1,73-8,14
higher	87 (14,5)	17	19,5	1.00	reference	1.00	reference
Employment							
Employed	465 (78,8)	188	40,4	1.00	reference	1.00	reference
Unemployed (seeking and not working)	35 (5,9)	32	91,4	15,71***	4,72-52,35	14,22***	3,73-54,26
Other (does not work because of caring for a child or other family member)	90 (15,2)	62	68,9	3,26***	2,01-5,30	3,01***	1,51-6,01
Marital status							
married	474 (79,0)	199	42,0	1.00	reference	1.00	reference
single, widow, divorced	126 (21,0)	85	68,0	2,86***	1,89-4,34	3,06***	1,72-5,46
Partner smokes							
Yes	253 (42,2)	128	50,6	1,25	0,91-1,74		

No	347 (57,8)	156	45,0	1.00	reference		
Other people (parents or friends) smoke							
Yes	563 (93,8)	272	48,3	1,95	0,96-3,96		
No	37 (6,2)	12	32,4	1.00	reference		
Household income assessment							
very high	33 (5,5)	15	45,5	1.00	reference		
high	88 (14,7)	52	59,1	1,73	0,77-3,89		
average	206 (34,3)	76	36,9	0,70	0,33-1,47		
low	248 (41,3)	125	50,4	1,22	0,59-2,53		
very low	25 (4,2)	16	64,0	2,13	0,73-6,21		
Income							
very low <700 PLN	69 (11,5)	41	59,4	1,46	0,68-3,14		
low, above 700 to 1000 PLN	213 (35,5)	111	52,1	1,09	0,57-2,09		
average, above 1000 to 1500 PLN	188 (31,3)	77	41,0	0,69	0,36-1,34		
high, above PLN 1500 to PLN 2000	86 (14,3)	33	38,4	0,62	0,30-1,30		
very high> PLN 2000	44 (7,3)	22	50,0	1.00	reference		
Subjective health assessment							
Very good	245 (40,8)	117	47,8	1.00	reference		
Good	275 (45,8)	123	44,7	0,89	0,63-1,25		
Neither good nor bad	70 (11,7)	38	54,8	1,30	0,76-2,22		
Bad or very bad	10 (1,7)	6	60,0	1,64	0,45-5,98		
Concern about the harmful effects of smoking							
Yes	355 (59,2)	56	15,7	1.00	reference	1.00	reference
No	245 (40,8)	63	25,7	1,75***	1,26-2,46	2,94***	1,84-4,71

Concern about the harmful effects of smoking on the fetus							
Yes	293 (48,8)	40	13,5	1.00	reference	1.00	reference
No	307 (51,2)	79	25,7	1,65**	1,20-2,89	1,89**	1,20-2,99
Trimester							
I trimester	32 (2,0)	21	65,6	2,26**	1,25-5,65	6,93***	2,57-18,71
II trimester	128 (15,9)	79	61,7	2,24***	1,50-3,36	2,37**	1,38-4,09
III trimester	440 (82,1)	184	41,8	1.00	reference	1.00	reference
Having children							
Yes	270 (45,0)	145	53,7	1,59**	1,15-2,21	4,03**	2,46-6,61
No	330 (55,0)	139	42,1	1.00	reference	1.00	reference
ETS hour/day							
0	336 (56,0)	111	33,0	1.00	reference	1.00	reference
<1h	57 (9,5)	28	49,1	1,96*	1,11-3,45	2,27*	1,07-4,81
1–5 h	113 (18,8)	70	62,0	3,30***	2,12-5,14	3,21***	1,82-5,66
5–8 h	40 (6,7)	36	90,0	18,24***	6,30-52,79	20,63***	6,79-62,70
>8 h	54 (9,0)	39	72,2	5,27***	2,78-9,99	3,01***	1,35-6,70
Passive smoking >1 hour/day#							
No	393 (65,5)	139	35,4	1.00	reference		
Yes	207 (34,5)	145	70,0	4,27***	2,97-6,15		

a Model including all statistically significant variables in one-factor analysis. Passive smoking (ETS – environmental tobacco smoke.) *** p ≤0.001. ** p ≤0.01. * p ≤0.05.

Variable not included in multifactorial regression due to overlapping information with the ETS variable number of hours per Day

Table 6. Odds Ratios (OR) and 95% Confidence Intervals (CI) for continuing smoking during pregnancy in the study group (n = 284) depending on selected characteristics

Characteristic	N (n=284)	Continuing smoking during pregnancy N=119 (41,9%)		Univariate logistic regression		Multivariate logistic regression a	
		n	%	OR	95% CI	OR	95% CI
Age (years)							
19-24	84 (29,6)	36	42,9	1.00	reference	1.00	reference
25-29	105 (37,0)	36	34,3	0,69	0,38-1,28		
30-34	68 (23,9)	29	42,6	0,99	0,48-2,05		
35-44	27 (9,5)	18	66,7	2,67*	1,06-6,32		
Education							
basic	45 (15,8)	16	35,6	2,98	0,73-16,12		
professional	84 (29,6)	52	61,9	4,23	0,87-10,14		
secondary	138 (48,6)	49	35,5	2,95	0,63-5,34		
higher	17 (6,0)	2	11,8	1.00	reference	1.00	reference
Employment							
Employed	188 (66,7)	70	37,2	1.00	reference	1.00	reference

Unemployed (seeking and not working)	32 (11,3)	13	40,6	2,05*	1,14-3,67		
Other (does not work because of caring for a child or other family member)	62 (22,0)	34	54,8	1,15	0,53-2,49		
Marital status							
married	199 (70,1)	95	47,7	1.00	reference	1.00	reference
single, widow, divorced	85 (29,9)	24	20,2	2,32**	1,34-4,03		
Partner smokes							
Yes	128 (45,1)	72	56,2	1,89**	1,23-3,25		
No	156 (54,9)	47	30,1	1.00	reference	1.00	reference
Other people (parents, friends) smoke							
Yes	272 (95,8)	115	42,3	1,46	0,43-5,01		
No	12 (4,2)	4	33,3	1.00	reference		
Household income assessment							
very high	15 (3,3)	5	33,3	1.00	reference		
high	52 (18,3)	9	17,3	0,42	0,11-1,53		
average	76 (26,8)	35	46,1	1,71	0,53-5,50		
low	125 (44,0)	59	47,2	1,79	0,57-5,56		

very low	16 (5,6)	11	68,7	2,40	0,97-16,81		
Income							
very low <700 PLN	41 (14,4)	32	78,1	5,33***	4,12-43,14		
low, above 700 to 1000 PLN	111 (39,1)	47	42,3	3,86	0,87-16,72		
average, above 1000 to 1500 PLN	77 (27,1)	23	29,9	2,70	0,72-10,07		
high, above PLN 1500 to PLN 2000	33 (11,6)	14	42,4	4,67	0,94-19,05		
very high> PLN 2000	22 (7,7)	3	13,6	1.00	reference	1.00	reference
Subjective health assessment							
Very good	117 (41,2)	54	46,1	3,28	0,48-26,15		
Good	123 (43,3)	50	40,6	3,12	0,38-12,54		
Neither good nor bad	38 (13,4)	14	36,8	2,92	0,31-27,22		
Bad or very bad	6 (2,1)	1	16,7	1.00	reference		
Concern about the harmful effects of smoking							
Yes	221 (77,8)	71	32,1	1.00	reference	1.00	reference
No	63 (22,2)	48	76,2	6,76***	3,53-12,93		
Concern about the harmful effects of smoking on the fetus							

Yes	223 (78,5)	70	31,4	1.00	reference	1.00	reference
No	61 (21,5)	49	80,3	8,93***	4,45-17,90		
Trimester							
I trimester	21 (7,4)	6	28,6	1.00	reference		
II trimester	79 (27,8)	29	36,7	1,45	0,50-4,14		
III trimester	184 (64,8)	84	45,6	2,10	0,78-5,68		
Having children							
Yes	145 (51,1)	31	21,4	1.00	reference	1.00	reference
No	139 (48,9)	88	63,3	6,34***	3,74-10,77		
ETS hour/day							
0	111 (39,1)	13	11,7	1.00	reference	1.00	reference
<1h	28 (9,9)	10	35,7	4,19**	1,59-11,04		
1–5 h	70 (24,6)	41	58,6	6,66***	5,01-22,64		
5–8 h	36 (12,7)	30	83,3	9,79***	13,08-63,12		
>8 h	39 (13,7)	25	64,1	8,33***	5,59-32,41		
Passive smoking >1 hour/day#							

No	139 (48,9)	23	16,5	1.00	reference	1.00	reference
Yes	145 (51,1)	96	66,2	9,88***	5,60-17,43		

Passive Smoking (ETS - environmental tobacco smoke). *** p ≤0.001. ** p ≤0.01. * p ≤0.05.

Variable not included in multifactorial regression due to overlapping information with the ETS variable number of hours per day

Discussion

In a study carried out by Wojtyła et al. as part of the Polish Pregnancy Monitoring System (Pol-PrAMS), over 18% of women smoked cigarettes in the last three months preceding pregnancy, and 81.9% of women declared that they did not smoke during this period. The percentage of women who smoked at least one cigarette in the last trimester was 7.7%. The percentage of women who smoked after delivery was 3.6%. The percentage of non-smoking women was 93.2%, 92.3% and 96.4%, respectively. Most women smoked cigarettes in the period before pregnancy [13]. In the study conducted by Wierzejska et al. the percentage of smoking pregnant women was 11.6% [14]. In the studies of women from Lodz and Opoczno, the percentage of pregnant smokers was 22% [15]. In a study conducted in 2007 in the Lodz region, the percentage of pregnant smokers ranged from 25 to 30% depending on the trimester. It was shown that smoking rates in Poland were much higher among single persons (60%) compared to married women (30%); persons with primary or secondary education (70%) compared to people with secondary education (45%) [16]. Balwicki et al. (2017) showed that significant barriers to quitting smoking during pregnancy included marital status, being unemployed, smoking by Barents and living with other smokers in the household [17]. Factors facilitating smoking cessation during pregnancy included: a higher level of mothers' education, secondary education among partners and having at least one more child. Some of the barriers, such as living with other smokers, have also been identified in other studies [18]. In the study of Flemming et al. (2015) it was also found that smokers in a difficult situation encounter greater barriers in quitting smoking compared to other women [19]. In a study by Fitzpatrick et al. about half of women who were permanent smokers temporarily quit smoking or quit smoking after delivery lived with a partner who smoked, compared with 37.8% of women who quit smoking because of pregnancy and 13.5% women who did not smoke. Similarly, 22.1% of permanent smokers and 17.9% of those who smoked after delivery lived with the person who smoked, compa-

red with 8.8% of women who quit smoking because of pregnancy. Smokers more often lived during pregnancy with a partner who smoked (OR 3.32, 95% CI: 2.34-4.72) or another person who smoked (OR 2.34, 95% CI: 1.38 3.97). Temporary quitting because of pregnancy was more likely than permanent quitting among women aged 25-29, single and single--child. Adjusted to these variables, they probably lived more often with the partner who smoked (OR 2.64, 95% CI: 1.74-3.99) [20].

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Causes and Consequences of Adverse Events in the Work of Nurses – Theory and Practice

Karolina Żelewska[1]

Elżbieta Majchrzak-Kłokocka[2]
https://orcid.org/0000-0001-8545-7525

[1] Pediatric Department, Hospital of St. Vincent a Paulo sp. z o.o., Gdynia

[2] Regional Specialist Hospital in Olsztyn, Department of Public Health, Faculty of Health Sciences, CM University of Warmia and Mazury, Olsztyn, Poland

Address for correspondence

Elżbieta Majchrzak-Kłokocka
Regional Specialist Hospital in Olsztyn, Department of Public Health,
Faculty of Health Sciences, CM University of Warmia and Mazury,
2/22 Mazowiecka Str., 10-699 Olsztyn, Poland
e-mail: emajchrzak@wss.olsztyn.pl

Abstract

Introduction: *The specificity of the nurse's work makes it a profession particularly vulnerable to the occurrence of adverse events and their frequency is still increasing. This makes it particularly difficult to ensure a high level of patient safety.*

Objectives: *The aim of this study was to investigate the causes of adverse events among nursing staff and the level of knowledge about adverse events and consequences resulting from their reporting.*

Material and methods: *Diagnostic survey method and literature analysis were used. A questionnaire technique was used. The author's questionnaire was used as a research tool. The study group consisted of 102 nurses working in hospitals in Trojmiasto.*

Results: *After analysing the obtained study results, there were significant similarities to the results obtained from other studies carried out on adverse events.*

Conclusion: *Even though most nursing staff reports the occurrence of adverse events, some events are still not reported, and the nurses' level of knowledge about the adverse events monitoring system is insufficient.*
Key words: nurses, adverse events, patient safety

Abbreviations

CMJ	Quality Monitoring Centre for Health Care
JCAHO	Joint Commission for Accreditation of Healthcare Organizations
NAM	National Academy of Medicine
RCA	Root Cause Analysis
SAC	Safety Assessment Code Matrix
WHO	World Health Organization
AE	Adverse Event

Introduction

Nursing is a profession that is constantly evolving and strives to provide the patient with the best conditions to maintain physical and mental health. One of the overarching goals of professional care is to provide the patient with high-quality medical services by ensuring their safety during hospitalisation. However, not only nurses, but many representatives of the medical professions (doctors, pharmacists, social workers, dietitians) participate in the treatment process. For this reason, it may be difficult to ensure patient's safety during treatment if the care system does not allow full information to be exchanged in a timely manner between all healthcare providers involved in the care process [1].

The specificity of the nurse's work makes this profession particularly vulnerable to the occurrence of adverse events.

Their number is still increasing. According to WHO (World Health Organization), medical errors affect every tenth patient, and from the data published in European Commission documents, it can be concluded that adverse events affect 8-12% of all patients who are hospitalised in the EU countries [2].

In Poland, adverse events are rarely reported by medical staff. This is due to the fear of consequences resulting from the event. For this reason, it is not possible to accurately determine their actual number. Adverse events, however, do not occur because of deliberate action of medical personnel to the detriment of the patient, but result from the complexity of functioning of health care systems, in which the effective results of treatment and therapy of each patient depend not only on the skills of individual employees, but on many factors [3].

Definition and types of adverse events

At the end of the 1990s, three comprehensive studies on medical errors were published – studies at Harvard University, studies on the quality of healthcare in Australia, and studies in Utah and Colorado, which highli-

ghted the importance of the concept of an adverse event [4]. Although adverse events are usually the result of medical intervention, not all adverse effects of treatment are the result of an error. Reflecting this fact, many researchers suggest that only avoidable adverse events can be attributed to medical error [5].

It is believed that a medical error occurs when a doctor, nurse or other medical employee did not exercise due diligence during their professional activities or exceeded his competences as a result of which the patient lost their life or health [6].

The Act of 6 November 2008 on patient rights and the Patient Ombudsman introduces the concept of a medical event. They should be distinguished from medical error, because a medical event is a broader concept [7].

The notion of medical occurrence refers to: "Infection of the patient with a biological pathogen, bodily injury or disturbance to the patient's health or death of the patient as a consequence of inconsistent with current medical knowledge:

1. diagnosis, if it caused improper treatment or delayed proper treatment, contributing to the development of the disease,
2. treatment, including surgery,
3. use of the medicinal product or medical device."

To consider a given situation as a medical event, the following criteria must be met: occurrence of the described effect (infection, injury, death) following a diagnosis, treatment or use of a medical product that is not in accordance with current knowledge [8].

If the above-mentioned situations occur, the patient has the right to seek damages or compensation and may apply for a medical incident to be established. Then, proceedings are pending before the voivodship commission for adjudicating on medical events competent with regard to the location of a given hospital [9].

According to some authors, the term "error" carries a stigma that can cause negative feelings, such as guilt and anger. They maintain that the term "error" is unduly negative and strengthens the culture of seeking

guilty. A doctor or nurse whose self-confidence and morale have been damaged by the error may act less effectively and efficiently and may even consider giving up a career in medicine [10].

Recently, the concept of medical error has been replaced by the concept of adverse event.

According to NAM, an adverse event/harm event is an unintended, but not always unexpected result of medical treatment. According to JCAHO (Joint Commission for Accreditation of Healthcare Organizations) and CMJ (Centre for Quality Monitoring in Health Care), this damage occurred during or as a result of treatment, but not related to the natural course of the disease and the patient's health. It is also a risk of damage. We can also distinguish a near-miss adverse event. It is a situation which, thanks to an action taken or by accident, ended successfully (the event did not affect the patient and no damage occurred) [11].

The currently accepted categorisation of adverse events was developed by the Canadian Patient Safety Institute in 2012 (Fig. 1).

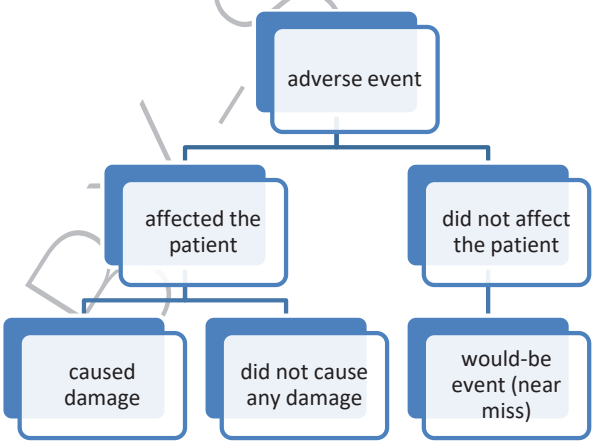

Figure 1. Categorisation of adverse events

Source: own, on the basis of [11].

Adverse events may include:

- clinical activities: incorrect identification of the patient, the surgical site, procedures, foreign body left in the operating field, incorrect diagnosis, failure to provide care;
- pharmacotherapy: wrong medicine, wrong dose, wrong patient, wrong time of drug administration, solvent, route of administration, administration after expiration date [12].

A common mistake made by nurses includes the performance of medical orders that were not entered in the individual medical order sheet. This is the only document on the basis of which nurses can perform medical procedures. This obligation is regulated by the Regulation of the Minister of Health of December 21, 2006 on the type and scope of medical documentation in healthcare facilities and how it is processed (Journal of Laws of 2006, No. 9, item 45). It often happens that the entered medical orders are illegible or incomplete, which may cause a mistake. The risk of making a mistake increases especially when the tasks are carried out by overworked staff and in a hurry [13].

Adverse events may also include:

- transfusion of blood and its components: incorrect identification of the patient, administration of the wrong unit, other activities related to transfusion of blood, blood products;
- medical equipment, work organization: equipment failure, lack of availability of medical devices, insufficient on-call staff;
- other: e.g. falls, suicides, suicide attempts [12].

Adverse events that affected the patient and cause harm constitute a limited subset of all medical errors. Most errors do not cause injury to patients, because the error was identified in time and mitigated, the patient was immune or because of mere luck. Error cause model – „Swiss cheese model" (Fig. 2.) James Reason illustrates how this concept applies to healthcare [10].

According to him, most complex systems and work environments, such as hospitals, have several layers of protection that provide protection against the negative consequences of error (marked by se-

veral pieces of Swiss cheese). Despite these safeguards, each layer of protection has numerous holes or flaws (holes in individual slices). Patient injury occurs only when circumstances arise that cause the defects of each of the individual layers of protection (or holes in the slices of cheese) to level out in a way that allows the error to penetrate their protection and reach the patient [4].

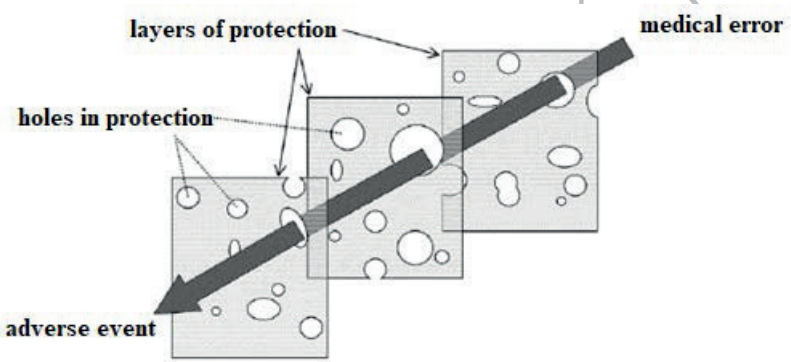

Figure 2. Swiss cheese model
Source: [4], p. 42.

Currently, the phenomenon of "dissociation of medical error" is being discussed. This means that there are many reasons that lead to an adverse event. One of them is ergonomic problems in the work of nurses. Among them, there are factors such as:

- shift work, overtime, night time,
- interpersonal conflicts, time pressure, constant stress,
- insufficient nursing staff,
- exposure to chemical, biological or physical agents [15].

The table below presents a detailed list of factors that may contribute to errors in clinical practice.

Table 1. Factors affecting the occurrence of errors

FACTOR TYPE	ASSOCIATED FACTORS
Factors that depend on the patient	Health Language and communication Personality, social factors
Factors related to the implemented tasks and the way they are performed	Assigning tasks Availability of protocols and their use Accuracy and availability of results Measures to help decision making
Staff-related factors	Knowledge and skills Competence Mental and physical health
Teams-related factors	Written communication Verbal communication Seeking support Team structure
Work environment-related factors	Employment level Workload Equipment availability Support for managers Working environment Physical factors
Management and organization-related factors	Financial resources Organisational structure Policy, goals and standards Safety culture
Factors related to the organization and its functioning	Organisation finances Health care organisation Relations with other organizations

Source: [12].

Adverse event monitoring system – assumptions

Researchers in human factors have acknowledged the importance of recognising errors (with appropriate timely feedback) as a powerful tool for learning, shaping behaviour, and achieving goals. Adverse event monitoring systems are designed to enable learning from their mistakes [14].

At the beginning of 2017, the Ministry of Health submitted for public consultation draft assumptions for the bill on quality in health care and patient safety, which aims to introduce legal and organisational solutions to the Polish health care system to achieve the overarching objectives of

health policy regarding the quality of services provided, primarily due to the implementation of quality and safety monitoring systems, reporting and analysis of adverse events, risk management, medical records and the accreditation system for healthcare entities [18].

The bill involves the creation of an Agency for the Quality of Health Care and Patient Safety to replace the Quality Monitoring Centre for Health Care. Its task is to constantly monitor the quality of work of entities carrying out medical activity in the area of obligations resulting from the draft provisions, including operating an adverse event monitoring system [18].

System assumptions

According to the assumptions of the project of the Ministry of Health from July 1, 2019, the obligation will be implemented to monitor adverse events, as well as to report them to the Agency for Health Care Quality and Patient Safety. Based on the obtained information about high risk events, it will analyse and give recommendations that will be presented as so-called security messages. An adverse event monitoring system is necessary to identify solutions to improve patient safety [16].

This system is a response to the expectations of society and is also an indicator of the level of risk in the health care system and helps improve the quality of services provided. Currently, the register of medical events and drawing constructive conclusions from their analysis is one of the elements in assessing the quality of medical care in the hospital accreditation program. Accreditation forces the analysis and collection of data on the clinical activity of the therapeutic entity, including adverse events [12].

According to the assumptions of the system, all engaged persons should participate in the reporting of adverse events, not only medical personnel but also patients and their families. Reporting is voluntary, unencumbered, and reported information about the event, while the data of the reporting person is confidential [12].

The adverse event reporting system works independently of other systems and regulatory processes in force (professional and criminal liability system, system of complaints). The content of the reports is protected against court and prosecutor's insight, and the person reporting the event should not be subject to any judicial or disciplinary proceedings.

The system is not intended to find a person responsible for the occurrence of an event. Attributing blame is considered to be the main limitation of the health care system, which makes it difficult to improve the quality of care and manage risk properly [17].

Reporting an adverse event is based on an established form, and its analysis is carried out according to specific guidelines – the London Protocol or root cause analysis (RCA) [12].

Adverse event reporting procedure

The management of the healthcare entity decides to introduce a system for reporting an adverse event. They also appoint a leader and team, define their tasks and scope of responsibility, and introduce patient safety policy in the entity. They present assumptions and concepts to subordinate staff. Support the leader in their work and are responsible for introducing new recommendations [18].

When an adverse event occurs, it is very important to provide medical care, inform the patient or their family about the event, emotional support for the patient and personnel participating in the event, proper protection of medical items and documentation. Adverse event can be reported by both medical and non-medical staff up to 24 hours after its occurrence by completing an electronic or paper form.

In accordance with WHO recommendations, the form needed to report an adverse event should contain elements such as: employee data, their position, patient data (age, gender, General Ledger number), event location, time of occurrence of the event, factors that influenced the occurrence of the event, event categorisation, result of the event (for the hospital and the patient), direct reaction after the event, comments

and notes. Data such as time and location of the event, as well as patient and reporting person's data are deleted after 14 days from reporting [12].

The adverse event report is sent to the team leader who reads the report and decides to carry out the analysis and explanation or to withdraw from it. Then selects the analysis method. The composition of the team which carries out the analysis of the request, searches for existing problems and conducts proceedings to investigate the event is determined. Interviews with participants of the incident are carried out, the severity and likelihood of occurrence are assessed, and root cause analysis done. To assess the severity of the event and the likelihood of occurrence, the SAC safety evaluation matrix giving a point score is used (Table 2). It was developed by the National Patient Safety Centre at the Department of War Veterans [12].

Table 2. Event Safety Evaluation Matrix

SAFETY EVALUATION MATRIX	GRAVITY OF THE EVENT			
	disastrous	important	moderate	irrelevant
PROBABILITY				
RARE	3	3	2	1
FREQUENT	3	2	1	1
EXTRAORDINARY	3	2	1	1

Source: [19], p. 15-20.

Each event can receive from 1 to a maximum of 3 points. Its value is determined on the basis of the intersection of a given column and row in the table above (1 point means low threat, 2 moderate, 3 high threat, high damage). An event scored at 3 points indicates a serious adverse event [19].

The incident analysis can be based on the RCA (root cause analysis) model recommended for the analysis of serious events, which was developed by the US National Patient Safety Centre at the Department of Veterans' Affairs or according to the British model – London Protocol.

The team determines additional factors that may have led to an adverse event. The most important questions when analysing the causes of an adverse event are: "What happened?", "When did it happen?", "How did it happen?", "What to do so that it does not happen again?". This makes it possible to find the reasons for the event, and not the person responsible for the adverse event [12].

After analysing the event, the recommendations are defined and implemented to prevent a similar adverse event from occurring in the future. These can be, among others, training for staff. Active management of the branch is essential at this stage. The effectiveness of introduced changes and solutions is also monitored. The person who reported the occurrence of an adverse event is given feedback on the analysis of the event (Fig. 3). A very important element is also the dissemination of information about the implemented solutions and necessary changes. The entire process of analysing an event should take about 10 days from the time when the adverse event occurred [19].

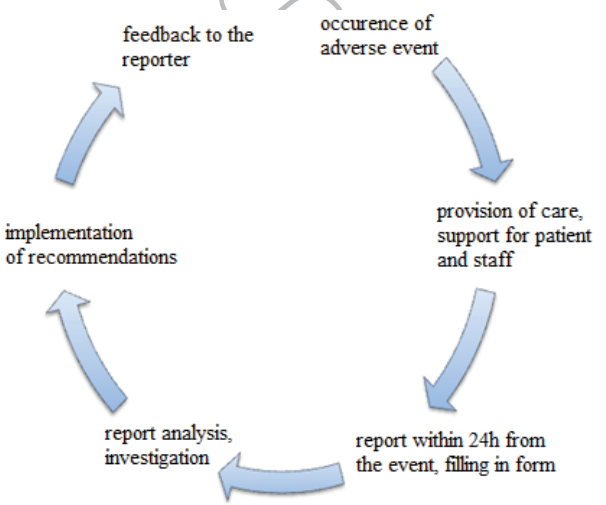

Figure 3. Adverse event reporting procedure

Source: [19], p. 5-26.

Developing a strategy after the analysis should be based on factors that are important for patient safety. Recommendations that fall within the management's competence should be implemented.

Adverse event analysis teams

Adverse events considered serious and the near-miss adverse events should be analysed using root cause analysis (RCA) [12].

The analysis is performed by a special team that is appointed by the management of the medical entity. It is resolved after the event analysis is completed. A person who appears in each team for adverse event analysis is the team leader. A specially trained person in the field of patient safety can be a leader. The leader and the management decide who of the people involved in the adverse event will be in the team. There are usually 4 to 10 people in a team. There is also the possibility of ad hoc appointment of experts in various fields that are helpful in analysing the event. It is significant that the team should include a person who is a representative of the management of the medicinal entity [19].

An important element is to schedule the team's work (meeting dates, meeting place, supporting materials). Meetings of the entire team take place according to a predetermined order, at a specific time and are mandatory, absence is only allowed in exceptional cases. The management is responsible for ensuring that the team has sufficient time for their work. Meetings should be held on a neutral ground, i.e. in a place that is distant from the ward in which the event occurred. Usually two to three such meetings take place, each lasting about two hours. In addition, the time needed by the team leader to analyse a given case, conduct interviews, visit the incident site, and prepare a final report should be taken into account [19].

The legal aspect of adverse events

The system assumes the exclusion of legal consequences for persons who report an adverse event (the exception is intentional fault or negligence)

and prevents access, including judicial or prosecutor's insight, into the content of data that is collected in the adverse events monitoring system. The assumptions of the project show that a person who reports such an event will not be subjected to disciplinary proceedings by their employer and will not be subject to criminal liability (excluding intentional fault or negligence) [8].

If an adverse event occurs, the employer should begin the analysis process and corrective actions that will not be aimed at finding and blaming the person responsible for the error, and above all the functioning systems that contributed to the error.

The difference between the terms "adverse event" and "medical event" should be emphasised. The occurrence of a medical event is the basis for initiating proceedings before the Provincial Commission for Adjudication on Medical Events [20].

Unlike medical events, an adverse event is usually characterised by the lack of premises that would trigger liability (there is no fault, there is no cause and effect relationship between the operation of hospital staff and the resulting damage, there was no incompatibility with current medical knowledge) [21].

Responsibility for a medical incident is sought before voivodship commissions for adjudicating on medical incidents on the basis of the Act on Patient Rights and the Patient Ombudsman of November 6, 2008. Medical events nowadays are increasingly the cause of lawsuits. There is also a tendency to award higher and higher amounts due to the patient for compensation and redress [8,20].

The Adverse Events Registry cannot constitute a source of claims for recipients, but should serve as a tool that will contribute to eliminating the causes of adverse events. The experience of countries where monitoring of adverse events has been functioning for many years shows that the elimination of punishment and personalisation during reported adverse events facilitates the functioning of the entire system, encourages reporting these events and promotes the improvement of care safety [12].

A nurse practising their profession must be prepared for the consequences of mistakes made. They should familiarise themselves with the applicable legal regulations regarding their profession in order to do their work fully consciously and safely. This applies, among others, to execution of medical orders. The nurse is obliged to enforce legible and understandable entries in the order sheet, because in the event of a mistake they will be responsible for the mistake [22].

Objectives

The aim of the study is to investigate the causes of occurrence and knowledge about adverse events and the consequences of reporting them among nursing staff.

The following research hypotheses were formulated:

- The most common cause of adverse events is staff stress and fatigue (ergonomic problems).
- Nursing staff are aware of the consequences of an adverse event.

Material and methods

The study was addressed to a group of nurses working in hospital wards in two hospitals in Trojmiasto. The study was conducted from February to March 2019. Sampling was random and participation in the study was fully anonymous and voluntary.

The diagnostic survey method and literature analysis were used in the work. A questionnaire technique was used. The author's questionnaire consisting of 17 questions, including 14 closed questions and 3 semi-open questions, was used as a research tool.

Among the distributed questionnaires, 102 sheets were completed correctly and were used for further analysis using MS Excel. A descriptive, statistical and graphic method was used to present the results of the research.

Study results

The most numerous group among the respondents – 41% were respondents over 50 years of age, 31% were in the range from 41 to 50 years of age, and the least respondents (8%) aged 31-40 years of age (Fig. 4).

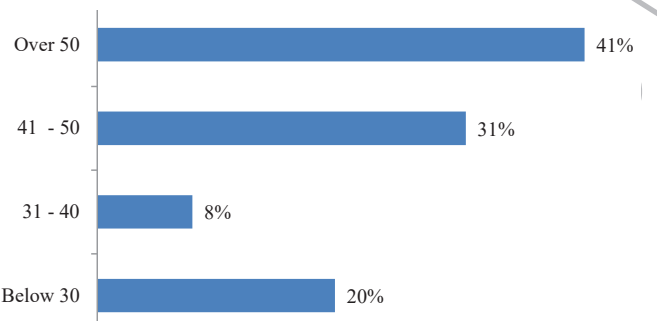

Figure 4. Age of the respondents

The highest percentage (40%) were respondents who graduated from medical vocational school, 23% of respondents had a bachelor's degree in nursing, while 12% had a master's degree in nursing (Fig. 5).

The most numerous group among the respondents (52%) were people with more than 25 years of experience, 21% of the respondents had 16 to 25 years of experience, 8% from 6 to 15 years, while 20% of the nurses surveyed had up to 5 years of work experience (Fig. 7).

Analysis of knowledge about adverse events

When asked if they had ever witnessed an adverse event, most of the respondents – 80% – said they had observed the occurrence of an adverse event, 13% replied that they had not yet observed an adverse event, and 7% of respondents said they did not know whether they had ever observed an adverse event (Fig. 6).

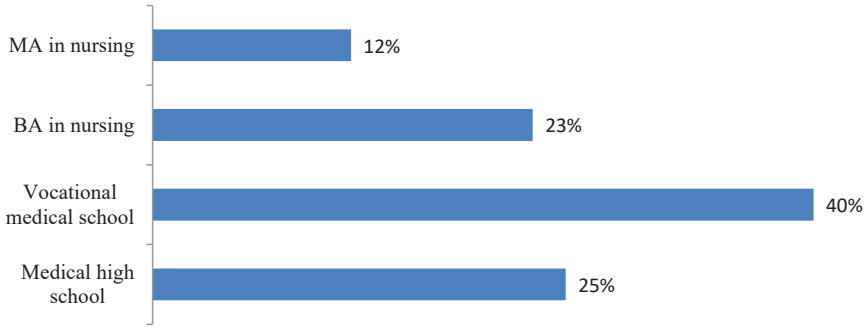

Figure 5. Education of the respondents

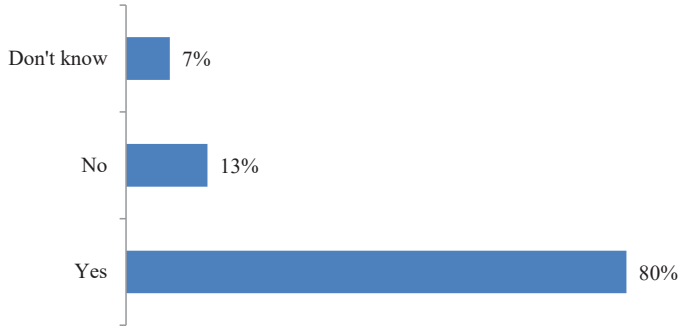

Figure 6. Responses

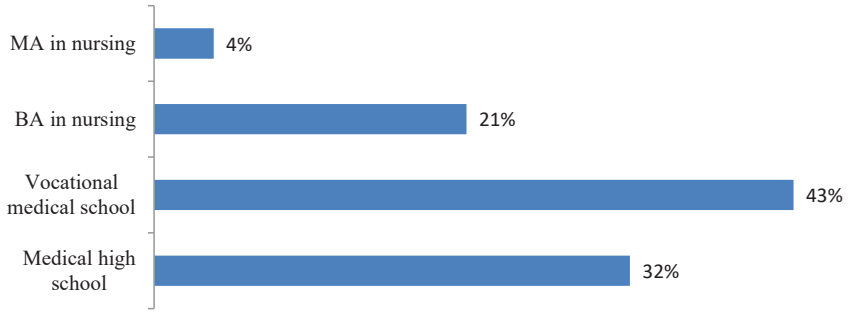

Figure 7. Education of respondents who answered incorrectly the question of who can report an adverse event

Among the surveyed nurses who answered positively to the above question, every second person had more than 25 years of experience in the profession, 17% from 16 to 25 years of experience, 10% from 6 to 15 years and 24% of the respondents who have ever observed an adverse event had up to 5 years of work experience in the profession.

Also, 90% of respondents said that they know how to report the occurrence of an adverse event.

The next question checked the knowledge of the respondents about who can report the occurrence of an adverse event. The correct answer is the answer: „An adverse event can be reported by any employed person". This is how 48% of respondents answered, while the majority of respondents – 52% – incorrectly stated that an adverse event can only be reported by medical personnel.

Among those who answered the above question incorrectly, 43% had graduated from medical vocational school, 32% medical high school, 21% had a bachelor's degree in nursing, and 4% had a master's degree in nursing (Fig. 7).

Also, 70% of respondents said that they always reported the occurrence of an adverse event when they observed it, while every third person did not always report such an event. More than half of the respondents claimed that a monitoring system for adverse events is needed (56%), 26% said that in their opinion such a system is not needed, and 18% have no opinion.

Respondents were asked whether they believe that the adverse event reporting system works independently of other systems, such as the complaint or criminal liability system. The correct answer is yes. The adverse event monitoring system works independently of other systems. Only 35% answered positively to the question, 19% answered that the system does not work independently of other systems. However, the largest number of respondents in the study group – 46% – did not know the answer to the question (Fig. 8).

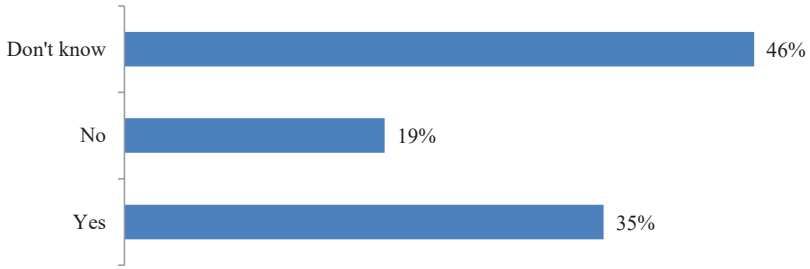

Figure 8. Knowledge of respondents about the operation of the AE monitoring system

Most respondents indicated the most frequent adverse event as mistake in drug administration (42%), falls – 29%, incorrect identification of the patient was indicated by 13%, failure of medical equipment – 12%, lack of equipment availability – 3%, other adverse events were indicated by 1% of respondents, mentioning employee infection here (Fig. 9).

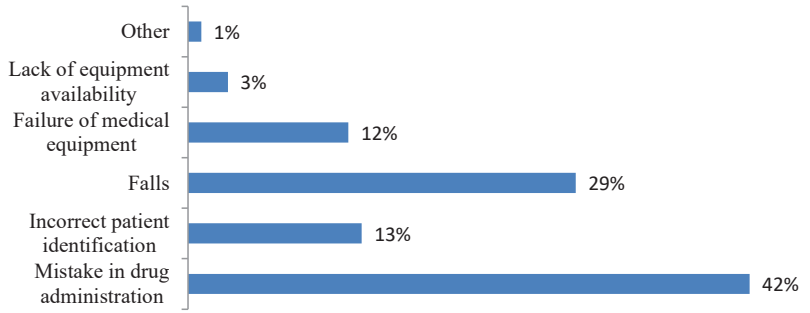

Figure 9. Types of AE occurrence according to respondents

42% of the respondents indicated the wrong patient as the type of adverse event most often occurring in the event of a drug mistake, 29% indicated the wrong dose, 26% of the respondents indicated the wrong drug, while the wrong route of administration was indicated by 2% of the nurses surveyed.

Most of the respondents indicated stress and fatigue (42%), insufficient nursing staff during on-call duty – 32%, 14% of respondents indicated poor communication in the team, 10% shift work, 3% wrong organization of the workplace. No response was reported regarding exposure to biological, chemical and physical agents (Fig. 10).

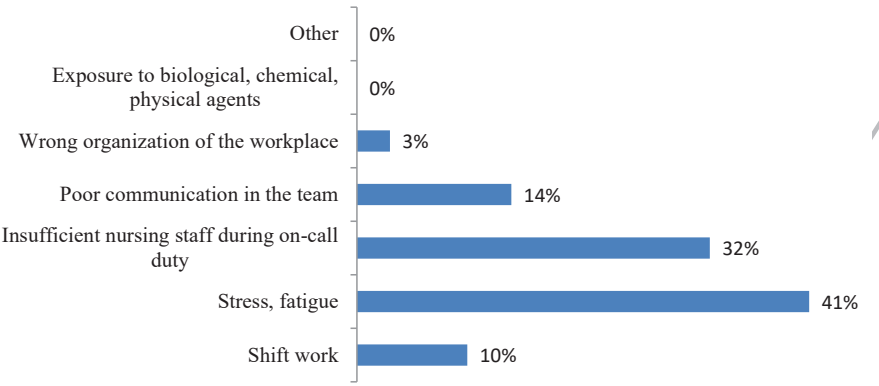

Figure 10. Factors impacting the occurrence of AE

Respondents were asked whether they were aware of the consequences of reporting an adverse event. Most respondents – 86% said they were aware of these consequences, while 14% said they were not aware of them.

The knowledge of the surveyed nurses about whether persons reporting an adverse event could be subject to disciplinary or court proceedings by the employer was also checked. The analysis showed that 42% of respondents did not know the answer to the question asked. 32% of respondents said that persons reporting an event could not be subject to such proceedings, while 25% of the surveyed group replied that a person reporting an adverse event could be subject to disciplinary or judicial proceedings by the employer (Fig. 11).

The respondents answered the question about the knowledge of how the risk management system works. 44% of respondents answered affirmatively, 9% of respondents did not have knowledge about this topic, while almost every second person (47%) among the respondents did not know the answer to the above question (Fig. 12).

According to 61% of respondents, ensuring a high level of patient safety is affected by taking actions to eliminate the cause of an undesirable event, 15% indicated the implementation of corrective and preventive actions, 14% of respondents – analysing and drawing conclusions, responsibility for their actions and actions of colleagues having impact on patient safety was indicated by 11% of respondents (Fig. 13).

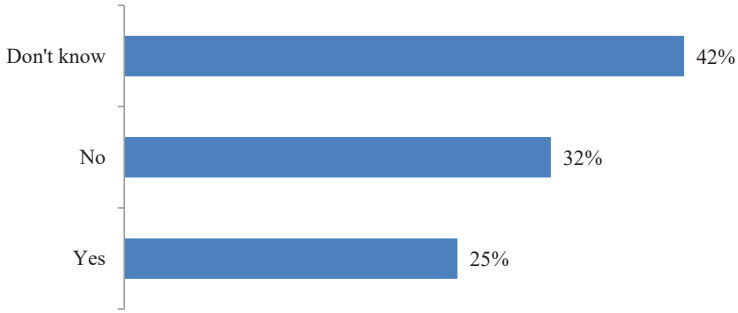

Figure 11. Respondents' knowledge about the behaviour of the employer after reporting the AE

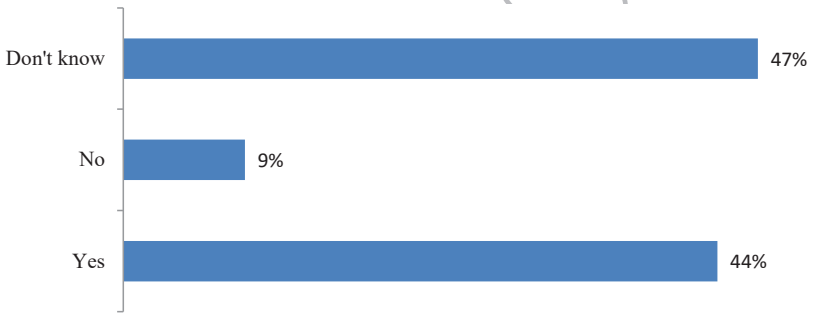

Figure 12. Respondents' knowledge of the risk management system at their workplace

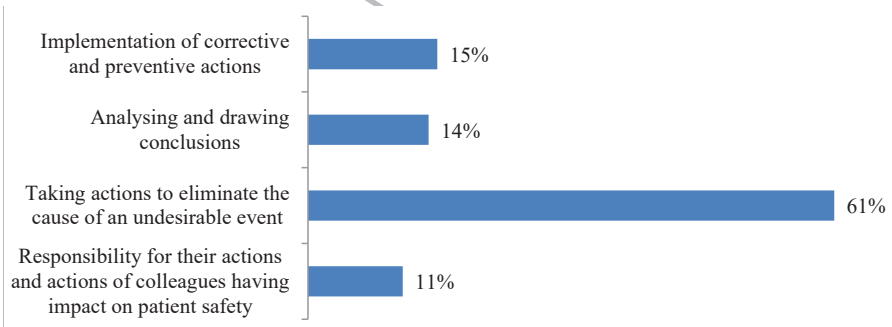

Figure 13. Actions affecting patient safety

Discussion

The aim of the study was to investigate the causes of occurrence and knowledge about adverse events and the consequences of reporting them among nursing staff. The obtained results of the study responded to the research problems posed and partly confirmed the previous hypotheses.

Adverse events are a serious health care problem. According to WHO and the European Commission research, the incidence of adverse events is steadily increasing. According to them, 27% of the European Union citizens surveyed have personally experienced an adverse event or the respondent's family has experienced it. [23].

Our own research shows that 80% of the surveyed nurses witnessed an adverse event. Nurses with longer work experience were more likely to witness such an event. Almost half of them had over 25 years of professional experience. Similar are the results from research conducted in 2015 by the Society for the Promotion of Quality of Health Care in Poland. According to them, the youngest staff were the least frequently involved in adverse events [24].

Most of the surveyed nurses (56%) thought that an adverse event monitoring system was needed, and almost all (90%) said they knew how to report an adverse event. Despite this, they still do not always report the occurrence of such an event.

Of the respondents who observed an adverse event, 30% did not always report this fact. Similarly, the research conducted by Mayo and Duncan, according to which only 45.6% of the examined group of nurses believe that all adverse events are reported [25].

The vast majority of respondents (86%) said they were aware of the consequences of reporting an adverse event. However, the results of the study prove that nurses' knowledge of adverse events and their consequences is still low.

Over half of the respondents (52%) incorrectly stated that only medical personnel can report an adverse event. Only 35% of respondents said that the adverse event monitoring system works independently of other

systems. Only every third person answered correctly the question about the employer's conduct towards the employee after reporting the incident. Every fourth person believes that after reporting a ZN, they may be subject to disciplinary or court proceedings, and only less than half of the respondents (44%) knew that a risk management system was enabled in their workplace.

It is probably the above mentioned factors, such as insufficient knowledge of nursing staff about adverse events and their consequences, that not all of the occurring AEs were reported. Similar results present the research of Fry and Dacey. According to them, the frequency of reporting adverse events is significantly influenced by the level of nurses' knowledge about AE [26].

However, research by Tang et al. shows that the most common reasons for nurses not reporting adverse events include emotional factors such as guilt, fear and fear of colleagues' reaction [27].

In the study, respondents indicated a mistake in drug administration (42%) as the most common adverse event. Most often, this type of event was considered to be associated with misidentification of the patient. The same is confirmed by research carried out by the Society for the Promotion of Quality of Health Care in Poland. It shows that the most common problem is drug-related adverse events. Every fifth respondent (20.2%) encountered them, and every fourth (26.8%) in medical treatment wards [24].

In the own study, the most common cause of adverse events among nurses the respondents indicated the ergonomic problems such as stress and fatigue (41%), followed by insufficient nursing staff during on-call time (32%). The results of the Society for the Promotion of Quality of Care report indicate similarly. Respondents considered the staff's too high workload to be a reason for the occurrence of AE. As much as 87.5% of respondents agreed with this [24].

The results of the RN4CAST study also confirm that excessive workload, which results from insufficient nursing staff, can lead to many negative phenomena, such as underestimating the quality of medical care provided and increasing patient mortality [24].

In the survey of the Society for the Promotion of Health Care Quality, every third person indicated the exchange of personnel experience as a potential opportunity to prevent adverse events. Medical staff also pointed out the need for further education and training related to caring for patient safety and thereby preventing adverse events [24].

In own study, three out of five respondents (61%) considered taking action to eliminate the cause of an adverse event as an effective method to ensure a high level of patient safety. This answer outweighs the other answers significantly.

After analysing the results of own research, it can be concluded that there are significant similarities to the results obtained from other studies conducted to date on adverse events. Although most respondents report an adverse event, these actions are still not sufficient. Organising training for nurses that complement their knowledge of adverse events and their potential consequences could significantly affect the frequency of reporting.

Conclusions

1. Nurses with more years of experience more often observe adverse events.
2. Nurses do not always report an adverse event if they observe it.
3. An adverse event monitoring system is needed.
4. Nurses' level of knowledge about the adverse event monitoring system is insufficient.
5. Not all nurses are aware of the consequences of adverse events.
6. The main cause of adverse events are ergonomic problems, including staff stress and fatigue, and insufficient nursing staff during on-call time.
7. The most common type of adverse event among nurses is a medication error due to misidentification of the patient
8. Ensuring a high level of patient safety is influenced by taking action to eliminate the occurrence of an adverse event.

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Business Models of Private Nursing Homes in Poland – Opportunities and Barriers in Implementing Good Practices of Design and Functioning

Anna Staszewska[1]
https://orcid.org/0000-0003-4727-8678

[1] Department of Entrepreneurship and Family Businesses, University of Social Sciences, Lodz, Poland

Address for correspondence

Anna Staszewska
Department of Entrepreneurship and Family Businesses
University of Social Sciences, 9 Sienkiewicza Str.
90-113 Lodz, Poland
e-mail: astaszewska@san.edu.pl

Abstract

Dynamic demographic as well as socio-economic changes caused new niche on the health services market – silver economy sector. The value of global spending in the silver economy area, only in the private sector, is estimated at USD 15 trillion in 2020 and an upward trend is expected. The aim of this work is to analyse the opportunities and barriers in implementing good practices of design and functioning of business models of private nursing homes in Poland. The research material were the Internet sources of entities providing living services for people over 65 years of age, organisational documentation of companies and available literature. The analysis was based on meta-analysis. The results of the analysis of the above-mentioned sources of information and entities operating on the Polish market indicate that in Polish conditions there are no guidelines, especially in the formal, legal and organisational areas. Moreover, the paper indicates practical examples of opportunities and barriers in implementing good practices of design and functioning of business models of private nursing homes in Poland.

Key words: *private nursing homes, silver economy, business models*

Introduction

In the countries of the European Union, as well as in the USA, entrepreneurs are eager to see the economic potential in the global demographic changes. The value of global spending in the silver economy area, only in the private sector, is estimated at USD 15 trillion in 2020 and an upward trend is expected. Over the years, demographic change has led to the creation of a completely new niche on the medical and social services market (mainly at the local level) – the silver economy sector. Statistical data indicate that there are about 8.8 million people over 60 years of age in Poland, who also constitute a large group of recipients of various types of services in the emerging silver sector of the economy. The market is becoming more and more absorbent, systematically gaining customers (the natural consequence of the society ageing and getting wealthier). It should be noted that market development will not be possible if the needs of individual groups of seniors are not properly identified and confronted with their financial and health capabilities and market requirements, which for some entrepreneurs is an obstacle, and for others an opportunity for market development, stabilisation or advantage.

In Polish conditions, this niche is still formally, legally and organisationally suspended between health and social care, legally unregulated, which can be an opportunity as well as a challenge for entrepreneurs. The results of the preliminary analysis of the available literature indicate that entrepreneurs create and use already existing business models of activities focused on living and caring services, but in Polish conditions it is still a fresh and unrecognised topic. At the same time, it is worth noting that in scientific literature the definitions of the "business model" are extremely different, opposite, or even contradictory, which causes a problem [1]. Therefore, it is necessary to deepen the analysis and obtain reliable information and organise knowledge on the possibilities and success of providing living services to people over 60 years of age in Poland in comparison to other countries [2].

Material and methods

This paper is based on a descriptive analysis of available scientific literature, Internet sources, reports and other studies on business models of activities aimed at providing living and care services for seniors in Poland in comparison to other European Union and US countries.[1] The data necessary to conduct the analysis also included information obtained from websites on the functioning of specific cases, e.g. The Green House Project [3] – today a business activity carried out throughout the United States, which since 2001 began to expand into the senior services market, distinguished by an idea and a mission.

On the basis of the collected data the paper indicates opportunities and barriers in implementing good practices of design and functioning of business models, while indicating why they work in the given environment and how to adjust them to Polish conditions.

The research aim is to analyse the good practices in building and implementing the business models of activity focused on providing primarily benefits for people over 60 years of age in Poland. The paper discusses the classic forms of conducting such business – nursing homes, but also other solutions including housing estates, apartments and "blocks" designed to meet the needs of this niche. Based on the analysis, the challenges and barriers that private enterprises are currently facing are identified, as well as the possibilities and opportunities that will allow them to increase the efficiency of operations in this sector.

[1] Silver economy is a concept that takes into account the systemic approach, mainly on the social and economic level. It is a system that should primarily respond to the actual needs and expectations of the target group (seniors – people over 60), while taking into account their capabilities. The system's areas of operation also take into account the determinants of demand and supply. In addition, system activities are directed not only at satisfying strictly health needs, but also at counteracting social exclusion of this group.

Architecture of business model of activity focused on providing domestic services and market realities of the private sector of the silver economy

From the point of view of socio-cultural conditions, including health awareness or the wealth level of seniors in Poland, the entrepreneurs are facing the challenge: how to provide seniors with services which will actually be tailored to their needs and capabilities, while taking into account market reality.

According to data on the current and future condition of **long-term care** [4], there is a lack of infrastructure and qualified staff in Poland that would make possible achieving the goals of Long-Term Senior Policy in Poland [5], including providing conditions supporting active ageing of the society [6]. For the purpose of literature analysis, it was necessary to systematise such concepts as: ”long-term care”, “business model”, “silver economy”. Those three in the subject literature are variously defined, the result of which is “concept blurring”, which in practice causes problems (not only to entrepreneurs, but also, e.g., control bodies) of organisational and formal and legal nature, both in public and private sector. According to the provisions of the Act on medical activity, the long-term care falls within the scope of stationary and 24-hour health services other than hospital services [7]. The indicated description includes not only services for people over 60 years of age, but also chronically ill. A more precise definition was given by the World Health Organization, but it mainly refers to social rather than health policy, which can cause complications in running business activity “at the border” of two branches of the economy.

Silver economy is a concept which should be included in the scope of services provided within long-term care, but is definitely wider. The initial assumptions of the „silver economy” referred only to the economic system, which focused on meeting the needs of people over 60 years of age. Demand was to be created by actively involving seniors in building and developing the market, using their knowledge, experience and skills, and their potential. Ultimately, this idea spread quickly across Europe,

creating a dynamically developing field of the economy [8]. According to the provisions of the document „Growing the European Silver Economy", the silver economy is defined as an economic opportunity, an opportunity that is associated with the ageing of the society, and thus with the special needs of populations over 50 years of age [9]. The ageing population was divided into three groups (according to the "needs" criterion of the target group) into: active, "fragile" and "dependent" society, because it is the effects of such division that segment seniors as consumers on the silver economy services market. The value of global spending in the silver economy area, only in the private sector, is estimated at USD 15 trillion in 2020 and an upward trend is expected. In the EU public sector, the expenditure currently accounts for around 25% of GDP, and when analysing government expenditure, these are averaged values of 50% – with an assumed growth of 4% by 2060[2].

Observing the market, one can see a pattern where in the private sector most offers (both regarding the provision of living and care services) are directed to the first group – the active society. Currently, both in Europe and the USA, this market is characterised by the highest growth dynamics. It is connected primarily with the decision-making and financial possibilities of the interested parties themselves, the increase of their awareness as consumers and the society growing wealthier. Emergence of new consumer markets in the private sector determines the need of balancing the public spending on senior care. At the same time the demand for various types of services (from living, care to supportive, to attractive forms of spending free time), the ever-growing number of people over 60 years of age, creates favourable market conditions to meet the growing demand for them.

When analysing the available subject literature and Internet sources, the author repeatedly encountered problems related to understanding or defining the concept of the **business model**. The challenge for

[2] "Growing the European Silver Economy", background paper, European Commission, 23 February 2015. Available from: http://ec.europa.eu/research/innovation-union/pdf/active-healthy-ageing/silvereco.pdf [cited 13.09.2019].

the scientific community is to specify at least the criteria for comparing models for research purposes. This would facilitate the carrying out of in-depth business analyses in the silver sector, aimed at providing living services. One of the key problems is "blurring" the concept of **business model** and identifying it with the concept of "business activity". Without indicating specific elements consistent with the objectives, it is the mission of the conducted business, which will take into account the specificity of the target group, stakeholders, in confrontation with the resources necessary to conduct business and the impact of the environment.

Adrian Slywotzky defined the **business model** as a system of delivering goods to clients, generating and registering profit, selecting clients, defining and differentiating the offer, planning and defining tasks (which will be carried out independently and which should be commissioned), resource configuration, and market navigation [10]. In a similar, more orderly way, the concept was defined by Alexander Osterwalder and Yves Pigneur, creating: conceptual tool, consisting of elements interrelated with each other, thanks to which it is possible to express the logic of the enterprise's functioning and its specificity [11]. Following the authors' assumptions, business model should consist of such elements as: key partners, activities, resources, value proposition, customer relations, distribution channels, customer segment, cost structure and revenue streams.

Moreover, when designing the enterprise business model architecture, one should consider the typical aspects of running a business, such as: the size of the planned investment, scope of property liability, capital risk, source of capital, choice of business form, etc. However, if one wants to operate in the silver economy sector, it is necessary to take into account the needs and capabilities of seniors and to confront them with the mission and assumptions of the planned activity, covering non-economic benefits.

Over the past twenty years, an alarming demographic trend has been noticeable – the ageing of Polish society. The subject literature points out that by 2035, the population of people over 75 years of age may constitute a number exceeding 4.5 million Poles [12], entrepreneurs are still

lacking favourable system solutions, or at least systematising formal and legal standards in conducting and reporting on business in the private sector of the silver economy. At the same time it needs to be noted that in Poland the traditional senior care model still prevails. Most of the times when people aren't able to function on their own, the family and relatives take up care. This is mainly due to the current functioning culture of Polish households and the fact that in Polish society there is still an unfavourable stereotype regarding institutions that do not provide sufficient care, whether 24/7 or day care for an elderly person. Due to **lack of trust** the families are afraid to leave the loved ones, especially in public facilities, having reservations about the quality of service by the staff or services in general, including living, care and even supportive ones. In addition, even if the family/relatives or the senior decides on senior home services, it turns out that in the long run they cannot afford the "professional" care. Therefore, the entrepreneur should consider what elements in the business model could break such a barrier. It is a good practice to build an enterprise that employs loyal people who identify with their work. Providing staff with working conditions that enable them to perform their duties conscientiously and responsibly can be very beneficial in the long run. The German or Norwegian senior homes in their business model take into account not only the costs of employing highly qualified personnel, but also the opportunities for their development, and in some cases, also provide a place of residence or childcare. Polish entrepreneurs should think about what actions they should include in their business model, as the Polish labour market has a shortage of not only medical but also care staff.

Another challenge is the **financial situation** of the households run by seniors. The results of the InfoSenior report prepared by the Polish Bank Association show that the average monthly disposable income for people over 60 years of age in Poland is growing. In 2015 it amounted to PLN 1,792 and a year later PLN 36 more [13]. At the same time, analysing the structure of expenditure of seniors, in 2015 they were at an average level of PLN 1,460 and are growing. The increase in expenditure is prima-

rily determined by the increase in prices of basic goods, including food, as well as medicines, medical devices and hygiene products. The phenomenon of an increase in the wealth of the Polish society means that the forecasts for the age group over 60 years of age look good. Analysing the structure of the portfolio of Polish seniors, in March 2018 retirement benefits were collected by over 5.5 million people. In comparison to 2017, a year later there was an increase of 76.5% among people who receive a pension up to PLN 500. At the same time, the Social Security Institution (ZUS) indicates a dynamic increase in the percentage of persons receiving pension benefits above PLN 5,000 per month (in 2018 an increase of 49.5% compared to 2017). In 2018, 11% of seniors received retirement benefits in the amount of PLN 1,600-1,800; 10.4% between 1,800-2,000; 9.1% 2,000-2,200; and 7.7% of those entitled to receive old-age pensions have earned benefits at the level of 2,200-2,400 [14]. Seniors pay the most (25%) for basic needs, i.e. food. 23% of income is allocated for housing maintenance, and 9% of expenditure is allocated to medicine [15]. When analysing the financial situation of seniors, one should also take into account the economic situation of the family or relatives, as it turns out that they most frequent pay for the services. From the point of view of entrepreneurs operating private senior homes, the real problem is the lack of financial liquidity of clients or their resignation from services, which increases the risk of business operations. The report prepared by the Polish Bank Association shows that in a subjective assessment, 14% of Poles admit to problems with maintaining financial liquidity [16].

So how can an entrepreneur ensure financial liquidity if it is not possible to estimate regular financial inflows (frequent resignations, deaths, etc.)? Entrepreneurs wanting to adapt to the requirements of a group of recipients are increasingly proposing various forms of payment for the possibility of using long- and short-term services. The most popular are: instalments or the possibility of pledging an apartment to stay in a senior home – which in practice should be most of all legally regulated.

When designing a business model, one should think about **human resources**, without which it is impossible to implement the business.

A dynamic rotation of care staff is observed in the senior services market, which is a challenge for entrepreneurs. First of all, the lack of sufficiently qualified human resources is worrying. According to data from the Central Statistical Office, in 2016 165 doctors in Poland had a specialisation in geriatrics [17], which means that professional support at the level of health services is not only insufficient, but is worrying from a systemic point of view – there are no favourable conditions at the level of specialised education in this regard for medical personnel. In 2018, 173 people took specialised training in geriatrics (including 48 at residency level and 125 out of this mode), which places Poland below the European average compared to other European Union countries [18]. One of the solutions at the system level is to create conditions conducive to raising qualifications by medical and support staff of other specialisations, primarily internal medicine, day care or palliative medicine. The shortage of specialised nursing staff and medical carers does not allow entrepreneurs to create strategies for running senior homes in the long term. One of the reasons is frequent staff changes. The labour market in the silver economy sector is an employee market, which in consequence means that employees often change jobs looking for better working conditions. One of the reasons is the lack of permanent employment contracts, instead the proposed form of cooperation are contracts that force payment of own social insurance contributions, lack of social benefits and independent planning of unpaid leave. In addition, remuneration rates are not proportionate to the scope of duties performed, liability and the risk of burnout. When analysing average earnings of a carer of the elderly, in 2019 (data from the first quarter) the median earnings was PLN 2,370 gross, 25% of this professional group receives earnings below PLN 2,160, and only 25% above PLN 2,860 [19]. For comparison, the average salary of an elderly person in Germany is around EUR 1,747-2,661 per month. In addition, the human resources management policy takes into account compulsory leaves, additional opportunities for upgrading qualifications, as well as attractive social packages.

Insufficient (in terms of quality and quantity) **infrastructure** is one of the basic elements of building the quality of services in the silver econo-

my sector. The recommendations contained in the document prepared by the Ministry of Labour and Social Policy show that one of the main priorities for the development of the silver economy sector are [20]:

- dissemination of solutions supporting early diagnosis and planning of the chronic disease treatment process in the elderly,
- enabling the implementation of broadly defined measures for the development of infrastructure – from long-term care facilities, through specialist care to facilities where seniors maintain autonomy of functioning and use active methods of preventing social exclusion.

Senior homes are the most common form of business activity focused on the provision of living services. In the private sector in Poland their exact number is not known. This is mainly due to the fact that not all of them are registered or the information in the register of entities is out of date. One of the Internet sources (comparison of private senior homes) gives 382 results, which means that the customer can choose from a diverse range of services of different scope and standard [21]. When analysing the activities of these units, it turns out that the vast majority does not have a "consciously" designed business model that would take into account the local realities of the business, such as the possibility of employing appropriate staff, or what scope of services will be implemented. In Poland, when registering a business, one needs to indicate whether the unit will provide accommodation including nursing assistance (87.10.Z), which at the same time does not include professional healthcare (section 86), or without it, or will offer minimal care (87.30.Z). In addition, one should consider the profile of the client, which is already partly defined at the level of the Act. Businesses where the consumer is people with mental disorders will have separate PKD (Code of Classification of Business Entities) (87.20.Z) and, as a consequence, a completely different architecture of the business model. Depending on the scope of services included in the business model, the manager should properly approach the organisation of the entire business: from resource planning, building customer profile and budget, or to safeguarding against the consequen-

ces of not providing services regularly, especially to the sick and disabled. Senior homes, in their offers, present a different range of services, more and more often emphasising that nursing care is possible at an additional charge. Of course, the offer is structured so that the customer has a choice – they can buy nursing care once or use it regularly as a part of paid subscription. On the Polish market of senior services, not only nursing homes are available, where elderly people can live, but it is also possible to buy a house or apartment in a housing estate specially adapted for this purpose.

A detailed analysis of the offers of the silver economy sector has been characterised by the author in an article devoted to business models of private senior homes [22].

A senior who decides to stay at a senior home on a private market has the opportunity to choose from several options, which are:

a) Long-term place in a single or multi-bed room

The packages include a minimum living, care and support services [23]. Depending on the offer, the senior may additionally benefit from additional care of specialised staff, rehabilitation, cosmetic and wellness treatments, as well as participate in additional activities, such as trips and concerts. In contrast, the implementation standards of these services are primarily determined by the price, which ranges from PLN 2,000 per month, up to PLN 10,000 [24].

b) Daytime care at a senior home

An increasingly popular form of care for the elderly, providing primarily care and support services. The consumers of services are most often people who are independent, want and need contact with a group of peers and willingly participate in activating classes. The second profile of service recipients is people incapable of independent existence, who are entrusted to the care by relatives/family with whom they live on a daily basis, and there is no possibility to take care of them during working hours. A challenge, and also an opportunity for entrepreneurs, is to fill the niche of day care, especially in communal areas. Before the demand for this type of services began to fuel the economy (although

in Poland it is still a small percentage of the services offered), seniors living in communal areas usually had time organised by municipal cultural centres, church organisations, or circles of village housewives. These organisations did not provide medical or nursing care, which is the main difference in meeting the needs of seniors. The main benefits of day care centres are (from the client's perspective): extending the period of independent functioning of the senior, providing care and free time, preventing social exclusion. On the other hand, an entrepreneur running private senior homes, introducing the day care option to the range of services may not only have an additional source of income or diversify the financial risk of operations. In accordance with the principles of corporate social responsibility, it works favourably for the local community by activating the oldest demographic group to actively participate in its life.

c) Flat in a senior housing estate (a senior housing estate with cottages/apartments: form of payment: rent or buy-back and purchase of an apartment in a senior home, form of payment: price per month)

An example would be the proposals of Polish developers who, wanting to use the business models of investments carried out in Western Europe or the USA, 10 years ago built housing estates for seniors, but without taking into account the impact of socio-cultural factors – the traditional approach to care for seniors in Poland. Therefore, initially these investments did not bring the assumed return.

Separately categorise proposals from the construction sector that developers are trying to define as services from the social or health care sector. The model of operation is the construction of housing estates with the option of purchasing additional services, e.g. care. The value of the model is primarily the cumulation of a range of necessary services near the senior's apartment. The disadvantage, however, is primarily the lack of propagation of additional values or care for the quality of services. In addition, the average Polish senior still cannot afford such a solution, because the monthly rent may start at 4500 PLN [25]. However, in this respect, the market offers only a few possibilities, but preliminary reports

indicate the development of this niche, which is an alternative and an additional option for expanding the range of services by entrepreneurs [26]. This model is strictly profit-oriented. It consists of selling apartments or flats adapted to the needs of seniors, including barrier-free construction. An example is the Crystal Enclave (Kryształowa Enklawa) housing estate in Katowice, where residents can purchase services, e.g. cleaning or catering, for an additional fee. Within the estate, the developer has provided space for recreational, sport, beauty and cosmetic services. However, such a model does not include economic values that would activate this social group or otherwise act against its social exclusion. In the case of the housing estate mentioned above, however, the investor provides the so-called dispatch office (open 24 hours), in which the duty staff will have access to the tenants' short medical records (information about medicines and diseases), and may possibly take action and help the residents.

Some senior homes include in the business model the additional sources of income generated by the senior citizens themselves. In London, entrepreneur sociologists have been observing the birth and development of a new urban group of older people for several years. They are people at the retirement age, relatively healthy, with a lot of experience, who are willing to engage in various social initiatives, and have smaller expenses and greater savings. Developers, noticing the needs of this group, began to build "hotels" and then "villages" adapted to the seniors' needs. One can buy, rent a flat of various sizes, characterised by barrier-free architecture. In the village there are common meeting spaces, a fitness centre, gym, beauty salons, shops, libraries, etc. [27].

In Poland, this model is only being introduced by few entities. From the entrepreneur's perspective, the activity is focused on renting or administering the property entrusted by seniors. This means that in the light of the law it is not strictly running a senior home, but from the perspective of organisation or scope of provided services the model has common features with those indicated in points a and b. Seniors can pay the rent themselves or assign these activities to administrators. In addition, as part of the monthly fees (most often) they can purchase the possibility of

shopping, using the common parts where e.g. additional activities (sports, cultural, technical, etc.) are conducted. Analysing trends in the socio-cultural and economic environment (extending life expectancy, the society becoming wealthier) on the still young silver economy market in Poland, one should see the opportunity for entrepreneurs in this niche. Seniors stay healthy for longer and want to participate actively in society, more willingly "take" studies at universities of the third age, or form formal or informal groups to pursue their passions. The market reacts quickly, as evidenced by the adaptation of enterprises, especially in the medical, wellness, tourism and other services.

However, the average Polish senior will not be able to afford such a place. So what can an entrepreneur propose considering the Polish reality?

An interesting and effective solution in Western European countries and the USA is the emphasis in the business model on achieving non-economic benefits. An example is the concept where seniors can generate additional income through work, e.g. in the garden. The Green House Project is an undertaking that began operating in the USA since 2001. The vision promotes an approach where the community created in the Green House includes not only seniors and families, but also staff. The basis is building the relationships based on equality, strengthening and mutual respect and where people can live regardless of their ability to pay [28]. The results of the comparative study (15 other homes) conducted in 2011-2014 in 28 nursing homes indicate that the guidelines for implementing the model are not consistent and it is impossible to implement all good practices from the model assumptions. At the same time, the results of the study indicated that if the business model introduces additional elements, such as the possibility of obtaining additional income, and/or emphasising the specificity of the house itself – not only there is less rotation among consumers, but also staff [29]. In the study, the authors also point to a reduction in the number of residents' hospitalisations - which may be related to the seniors' increased physical activity [30].

Another example of an unusual business model is running intergenerational/multi-generational homes. The idea of intergenerational care

began in Japan in 1976, and then was embraced in the USA, Canada, the Netherlands and Great Britain, where in 2017 the house "Apple and Honey Nightingale" [31] was created, which is inhabited not only by seniors but also children.

Research conducted in the field of analysis of the intergenerational approach indicates the effectiveness of implementing such activities, included in the business model, while increasing social competences for both parties and act against social exclusion [32]. The main benefits mentioned by researchers analysing the "Adopt a Care Home" program are, above all, longer activation of the elderly, delaying the signs of ageing, and contributing to faster learning of children. Research results have indicated that the Program has been successfully implemented and may contribute to the development of communities conducive to e.g. dementia or other diseases of old age, while increasing knowledge and understanding of dementia among children and by engaging people living with dementia in increased activity, reducing the risk of social exclusion [33].

Summary

The National Institute of Senior Economy indicates that there are about 8.8 million people over 60 years of age in Poland, which, from the point of view of demand, is an opportunity for the development of this niche. The silver economy market in Poland, from the perspective of the sector life cycle analysis, is in the "implementation" phase. It is characterised by high business risk, lack of stable competition or suppliers. The very demand for services is only just forming [34], which means high volatility of prices of supplementary and complementary services and products. At the same time the analysis of available literature and sources indicated lack of practical guidelines in the documents regarding both building and implementing senior policy from the perspective of running a business (organisational and economic aspects) [35]. However, there are studies available, useful primarily to public organisations that create and implement senior policy, which take into account primarily social, formal, legal

and organisational aspects. There are no specific solutions, practical guidelines or know-how that would enable the involvement of the necessary financial, human and sustainable resources supporting the needs of seniors.

It is difficult to predict trends or plan actions in the long term. On the other hand, conditions, primarily demographic ones, force the demand for the development of living and care services, as well as activating this group of clients, which creates the possibility of creating new services/products or modifying the existing ones. Despite the difficult beginnings (construction of housing estates for seniors, for which there was no such demand as in the Netherlands or the USA), there are more and more services on the Polish market offering not a room in the centre, but an entire apartment with the possibility of buying complementary services, such as nursing care, shopping and even services from the cosmetology and wellness sector.

For private entrepreneurs, this is not only a challenge in order to attract customers, but also determines competition within the sector – which from the point of view of building the quality of services offered, especially long-term ones, is a favourable situation (for both parties).

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Choosing a Particular Hospital for Giving Birth by Women from Urban and Rural Area

Grażyna Bączek[1]
https://orcid.org/0000-0001-7897-9499

Waldemar Wierzba[2]
https://orcid.org/0000-0002-8134-2955

Barbara Baranowska[3]
https://orcid.org/0000-0003-2723-9604

Urszula Tataj-Puzyna[1]
https://orcid.org/0000-0001-9800-3434

Joanna Kapla[4]
https://orcid.org/0000-0001-6195-9811

Iwona Kiersnowska[5]
https://orcid.org/0000-0001-5615-367X

Dorota Sys[6]
https://orcid.org/0000-0002-6829-5947

Michał Szczerba[7]
https://orcid.org/0000-0001-6780-6613

Irena Walecka[8]
https://orcid.org/0000-0002-3502-3339

[1] Department of Obstetrics and Gynecology Didactics, Medical University of Warsaw, Warsaw, Poland
[2] University of Humanities and Economics in Lodz, Poland
[3] Department of Midwifery, Centre of Postgraduate Medical Education, Warsaw, Poland
[4] The Holy Family Specialist Hospital, Warsaw, Poland
[5] Department of Obstetrics and Perinatology, Medical University of Warsaw, Poland
[6] Department of Reproductive Health, Centre of Postgraduate Medical Education, Warsaw, Poland
[7] Katowice School of Technology, Katowice, Poland
[8] Dermatology Department, Centre of Postgraduate Medical Education, Warsaw, Poland

Address for correspondence

Waldemar Wierzba
University of Humanities and Economics in Lodz
26 Sterlinga Str, 90-212 Lodz, Poland
e-mail: wwierzba@post.pl

Abstract

Introduction and objective: *Choosing the facility for delivery is important for all women, regardless of their origin and place of residence. However that depends on the healthcare system, cultural and social standards in individual countries. Particularly significant in the perinatal period is the influence of the environment demonstrated by means of epigenetic mechanisms.*
The aim of the study was to determine the reason for choosing a particular facility by women from rural and urban areas and how did they gained the information on chosen delivery departments.

Material and method: *The study included examination of the distance traveled by the surveyed woman to carry the birth in the chosen hospital. Part of the study was to estimate the distances between the hospitals and the homes of the participants.*

Results: *Women from rural areas declare they travel a longer distance to a hospital located in the city, if midwives from nearby facilities do not provide access to pharmacological methods to relieve the pain of childbirth. Women from rural area usually travel 40-50 km to the chosen hospital, in contrast to women from the city who travel 7-20 km only. It is interesting to note that most women, both from the city and the countryside do not choose the nearest hospital. Women from rural areas more often indicated the need for neonatal intensive care unit (NICU) at chosen facility in the case of health problem with a baby. When choosing a hospital, it was also important whether a midwife or a doctor was in charge of pregnancy and delivery, were working in this facility.*
Conclusions: Women from the rural areas did not differ from women from the urban areas significantly in terms of preferred sources of information on the place to give birth. Most often it was the preference of the mother or the obstetrician recommendation.

Key words: *place of birth, intrapartum care, maternity hospital*

Introduction

The quality of birth, in accordance to the current guidelines of the World Health Organization, is related to the positive experience of giving birth in two perspectives [1].

Short-term, which consists of women's experience and obstetric-neonatal results, and in the long-term perspective related to future health effects. The conditions of delivery to the world determine the future health and life quality of the mother and the child. Particularly significant in the perinatal period is the influence of the environment manifested by means of epigenetic mechanisms [2]. The quality of obstetrics care includes components related to material resources (equipment of hospital wards), staff resources (number of personnel, experience and competence of medical staff) and components related to the standard of provided medical services [1].

Among the factors influencing the assessment of the obstetric care quality, we can take into account the distance between the place of residence and the facility where the services are provided, proper communication between staff and a patient, friendly arrangement of the facility for pregnant women or parturient and reliable services reflecting the needs of the individual and the local community [1,3,4,5].

Making a decision concerning the choice of hospital to give birth in is part of the process and one of the component of woman preparation to give birth to a child. The time of making decision on particular institution to give birth varies [6]. Women report the need to discuss the choice of place to give birth of birth with obstetrician [7]. Choosing a place to give birth, as well as Staff who is in charge of patient care are important components affecting the quality of birth [5,6,8]. The decision regarding the location of delivery is important for all women, regardless of their origin and place of residence, at the same time it depends on the health care system, cultural and social standards in individual countries [8,9,10]. Women from rural areas declare that they travel a longer distance to a hospital located in the city, if facilities near their residence are run by midwives only, who do not provide access to pharmacological methods to relieve the pain [11].

When deciding whether to choose a place of birth, women consider the safety of mother and child. In undeveloped countries the choice is limited to delivery at home, due to the lack of access to professional obstetrics care. However, the availability of obstetrics services in developed countries does not guarantee that women's expectations are met, and force institutions to raise the standard of provided care [9,10,12].

In Poland, a vast majority of deliveries take place in the hospitals. The choice of a particular institution, apart from the mothers' expectations and the distance from the place of residence, is also restricted due to the limited amount of qualified facilities the patient can be referred to, depending on medical issue. When referring to a hospital, the course of pregnancy, anticipated delivery procedure or the child's birth status, are taken into consideration, because special procedures can only be provided by certain hospitals. So in essence, referral to a hospital is prioritized depending on the gravity of the health problem [1,2,3]. There are 16 voivodeships in Poland, in each of them there are 11-52 maternity units and on average 25 facilities. Universal access to information about the services and quality of an establishment, as well as the ease of obtaining opinions of other women on websites and online portals makes decision-making easier and motivates them go to make an informed choice of a particular institution [13].

The aim of the study was to determine the reason for choosing a specific facility among women from rural and urban areas, the source of information on the selected facility and the distance the patient traveled from the place of residence to the selected hospital.

Materials and method

The study was conducted from December 2017 till February 2018 in the obstetric department in the Warsaw Hospital with the scale of priority being 2. There were 720 questionnaires distributed, of which 579 were filled out, and only 509 were correctly completed.

The authors' own questionnaire used in the study included demographic data related to age, marital and economic status, education level, parity, and place of residence.

Women estimated distances between the place of residence and the selected hospital, and concluded whether the chosen maternity hospital was the nearest to their place of residence or not. Also, women were asked to choose between two main reasons out of eleven as to why they chose a specific hospital. It was also questioned if the person overlooking the pregnancy works in the chosen facility and to point what was their source of the information.

This study was authorized by the Bioethics Committee of the Warsaw Medical University as a part of research of quality of childbirth no. AKBE/232/2017.

The following statistical methods were used to analyze the data: frequency tables and frequency of the distribution of responses, bipartite (cross) tables, chi-square independence test or Fisher's test. The analysis was performed at the significance level of 0.05 in the R and Excel programs.

The criteria for inclusion to the study group was delivery in the hospital where the study was carried out, no recommendations for parturition in a II and III (higher) degree of reference of the hospital or no direct transfer from the pathology ward to the delivery room.

Within a radius of 4 km of the hospital where the study was carried out, there were 5 other hospitals (including one which belongs to the private health care sector), there were 12 hospitals contracted for parturition in the whole city.

The majority of women were between 26 to 35 years of age, lived in Warsaw, were married, had a higher education level, and a good economic status. 13.2% of women came from the rural area (n=67). There were no statistically significant differences between the groups of women from the countryside and the city in terms of socio-demographic features (Tab. 1).

Table 1. Socio-demographic characteristic of responders

Demographic profile:	Variables	City n (%)		Rural n (%)		N	%
Age	≤20	1	1,49%	2	0,45%	3	0,59%
	21-25	5	7,46%	45	10,18%	50	9,82%
	26-30	30	44,78%	138	31,22%	168	33,01%
	31-35	22	32,84%	179	40,50%	201	39,49%
	36-40	6	8,96%	67	15,16%	73	14,34%
	>40	3	4,48%	11	2,49%	14	2,75%
Education level	elementary/secondary	2	2,99%	7	1,58%	9	1,77%
	vocational	1	1,49%	7	1,58%	8	1,57%
	post-secondary	15	22,39%	62	14,03%	77	15,13%
	master's degree	49	73,13%	366	82,81%	415	81,53%
Childbirth	1	32	47,76%	244	55,20%	277	54,42%
	2	28	41,79%	143	32,35%	171	33,60%
	3	5	7,46%	39	8,82%	44	8,64%
	≥4	2	2,99%	15	3,39%	17	3,34%
Marital status	miss	12	17,91%	86	19,46%	98	19,25
	married	55	82,09%	343	77,60%	398	78,19
	divorced	0	0,00%	13	2,94%	13	2,55
Economic status	poor	1	1,49%	3	0,68%	4	0,79
	good	50	74,63%	288	65,16%	338	66,40
	very good	16	23,88%	151	34,16%	167	32,81

Results

Figures 1 and 2 graphically present the estimated distances of the surveyed women from urban and rural areas to give birth to a child (Fig. 1). The furthest distance indicated was 100-300 km. Women from the countryside usually covered a distance of 40-50 km, while women from the city only covered a distance of 7-20 km.

Most women, both from the city and from the countryside, chose a different hospital than the one nearest to their place of residence (Tab. 2). In addition, some women who chose the nearest hospital were guided by different selection criteria than proximity to their place of residence.

The most frequently indicated criterion in both studied groups were the conditions of premises (Tab. 3). It was also important whether the midwife or the doctor in charge of pregnancy were working in this hospital. In rural-living women, the possibility of obtaining support in case of a problem in the neonatal pathology department was more often indicated (Tab. 3).

Women from the rural areas did not statistically significantly differ from women residing in the city in terms of the sources of information on the place to give birth. The main source of information was the opinion of other mothers or recommendations of the obstetrician who was in charge of the pregnancy (Tab. 4).

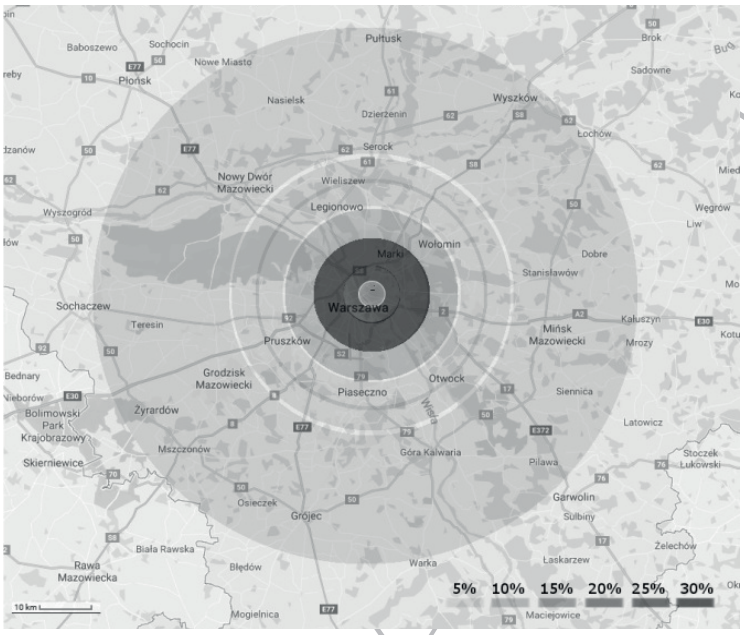

Figure 1. A map of the distance travelled by women living in the countryside (rural)

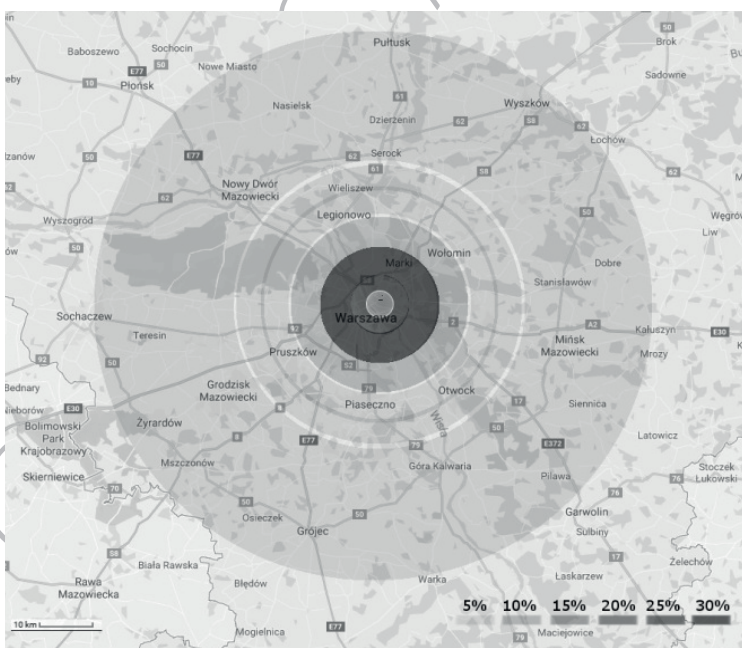

Figure 2. A map of the distance travelled by women living in the urban area

Table 2. Choosing a hospital with regard to the place of residence n=494

Variables	Rural		City		Statistical analysis
	n	%	n	%	
The nearest hospital	3	4,5%	150	35%	X2(1)=24.8831 P<0,05
Farther hospital	63	95,5%	278	65%	

Table 3. The most important reasons for choosing a maternity hospital among women from the countryside and the city (n=509, multiple choice question)

	Rural		City		Total	
	N	%	n	%	n	%
I chose the nearest hospital to my place of residence	3	2,24%	97	11,01%	100	9,85%
Newborn pathology department (possibility of getting support in the event of a problem)	21	15,67%	93	10,56%	114	11,23%
The doctor / midwife who was overseeing the pregnancy, works in this hospital.	29	21,64%	138	15,66%	167	16,45%
Good premises conditions of delivery rooms and maternity ward.	37	27,61%	212	24,06%	249	24,53%
Because it is a Child-Friendly Hospital	11	8,21%	62	7,04%	73	7,19%
Physcian has a high position in the ranking of foundation "Rodzić po Ludzku"	8	5,97%	57	6,47%	65	6,40%
Because a friend / someone from my family recommended this place.	10	7,46%	98	11,12%	108	10,64%
Because someone from the family or my friends works there.	4	2,99%	29	3,29%	33	3,25%
Because there were no spots available in any other hospital.	3	2,24%	18	2,04%	21	2,07%
I did not think about choosing a hospital	3	2,24%	15	1,70%	18	1,77%
I've been hospitalized here before and had a positive experience.	5	3,73%	62	7,04%	67	6,60%

Table 4. The relationship between the source of information and the place of residence (n=508)

	Rural		City		Total	
The sources of the information about chosen hospital	**n**	**%**	**n**	**%**	**n**	**%**
Other mothers opinion	29	43,3	179	40,6	208	40,9
gdzierodzić.info	2	3,0	53	12,0	55	10,8
Doctor	18	26,9	65	14,7	83	16,3
Midwife	2	3,0	26	5,9	28	5,5
Parents classes	5	7,5	43	9,8	48	9,4
Hard to say	3	4,5	17	3,9	20	3,9
Others	8	11,9	58	13,2	66	13,0
summary	67	100	441	100	508	100

Discussion

The study showed that the average distance that women travel from their place of residence to the place of birth is from 7 to 20 kilometers. Most of the respondents gave birth in a more distant hospital than the one nearest to their place of residence, or did not choose the nearest hospital because of its proximity and relied on other criteria's.

These results are different than those obtained by Adamska-Sala et al. 2018. In their study which was conducted on 8000 women giving birth in Poland, the choice of a particular hospital was most often given as its reason for proximity to the place of residence (36%) [13].

The tendency we observed was to choose a further hospital by both women from the city and the countryside does not appear in the results obtained by the Pitchort team. In their study conducted in Scotland in rural areas, although women declared their willingness to travel to a chosen facility, an important criterion for selection was a close location enabling the family to visit [11]. Similar preferences were used by women who were in their first pregnancy in the Borrelli et al. studies, where the proximity of the hospital was one of the most important elements in choosing the place of birth of the child [14].

In our study the presence of a properly equipped neonatal intensive care unit was not a significant criterion in the selection of a specific facility as opposed to Adamska-Sala results, where right after the criterion of proximity – the presence of a well-equipped neonatal pathology department significantly influenced the choice of childbirth (23%) [13]. The criterion of presence of neonatal intensive care unit becomes a differentiating element between women giving birth at home and choosing childbirth in a hospital [8,15]. Also, in the study Broda et al. The proximity of the hospital to the place of residence and the presence of the neonatal intensive care unit were the main reasons for choosing a specific hospital [7]. A low priority for this criterion in our study may result from the fact that each hospital within a few kilometers from the tested hospital has adequate facilities to care for a newborn baby requ-

iring special care, which is why this criterion did not differentiate these facilities.

In our studies, the main reason for choosing a specific hospital were the conditions of premises. Hospitals located within 5 kilometers of the hospital, which held our studies, differ in the décor, standard and equipment of delivery rooms and rooms in maternity wards. This criterion for choosing a child's place of birth was similar to the women examined by Borrelli et al [14].

The surveyed women from both the city and the countryside considered importance of place of employment of a doctor or midwife in the hospital chosen to lead their pregnancy. These results are confirmed by observations from Adamska-Sala et al., Showing that half of the women are delivering in hospitals employing a physician who oversees their pregnancies [13].

Most studies, including ours, show that women most often learn about the hospital they have chosen from their family and friends. These opinions are especially important in the case of the birth of the first child [14,16]. During the subsequent births, similarly as in our respondents, their own experience was helpful, allowing them to repeat the choice or in the case of traumatic deliveries – to change the place of birth in the event of a second pregnancy [17]. Some women were guided by the selected hospital's high rankings in the gdzierodzić.info.

Research conducted in the United Kingdom indicated the Internet as one of the most important sources of data taken into account in the decision-making process for choosing a place to give birth. Research shows that women are looking at the opinion of other mothers about the given hospital on the internet, searching the websites of hospitals to check the conditions offered by the facility and checking the status of hospitals and departments in the rankings [7,17].

Conclusions

1. Most women do not choose to give birth in the hospital nearest to them.
2. Good infrastructure is the main factor when choosing the obstetric hospital for the childbirth for women, both from the city and from the countryside.
3. The source of knowledge when selecting a hospital for childbirth is mainly influenced by the opinions of other mothers, as well as the recommendation of the doctor who is leading the pregnancy for women coming from the urban and from the rural areas.

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