Journal of Health Study and Medicine
2019, nr 3
ss. 5-25
DOI 10.36145/JHSM.2019.17

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

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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.

Funding: This research received no external funding.
Acknowledgments: This study was conducted from personal funds.
Conflicts of Interest: The authors declare no conflict of interest.

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