



PHYSICAL ACTIVITY AND LIFE SATISFACTION IN BLIND AND VISUALLY IMPAIRED INDIVIDUALS

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ABSTRACT

Purpose. Physical activity (PA) is known to have a positive influence on many physical and psychological aspects of human life. Despite the many benefits of an active lifestyle, the majority of adults in Western Europe do not perform regular PA, and this is especially so for adults with a disability, such as the blind and visually impaired. The purpose of this study was to assess the type and intensity of physical activity and subjective quality of life (life satisfaction) of blind and visually impaired individuals living in Poland and to analyze for potential differences in terms of their physical activity levels. **Method.** The short form International Physical Activity Questionnaire and the Life Satisfaction Questionnaire were administered to a sample of eighty-two individuals (mean age 38 years) with varying degrees of vision loss. **Results.** The study found that more than 50% of the respondents were classified as being highly active and that the total sample was “rather satisfied” with life “as a whole”. The level of PA performed was significantly positively correlated with the level of life satisfaction. **Conclusions.** PA increases the subjective quality of life in blind and visually impaired individuals.

Key words: physical activity, life satisfaction, quality of life, blind, visually impaired

Introduction

Physical activity (PA) is closely connected to mental health and the feeling of well-being [1]. Studies carried out in the European Union have found that the amount of physical activity performed (at vigorous, moderate, or walking levels of intensity) is highly varied among EU countries. For example, a study on eight EU countries found that the highest level of PA was recorded in Germany while the lowest in Italy [2]. Despite the many benefits of an active lifestyle, the majority of adults in Western Europe do not perform regular PA [3]. This is doubly so for individuals with a visual impairment, who are even less likely to participate in PA than the rest of the population [4, 5]. However, similar research on the blind and visually impaired in Eastern Europe, especially in Poland, could not be found.

Insufficient PA exposes adults who are blind and visually impaired to more health risks than sighted people. Ray [5] linked low levels of PA as an indirect cause of increased risk of stroke, osteoporosis, depression, hypertension, heart disease, diabetes, and falls in the blind. The difficulty the visually impaired have with performing motor tasks that require strength and speed, typical components of PA, places them at higher risk of chronic illnesses. Although reduced levels of PA are the result of less independence after experiencing vision loss, the inability to perform certain activities is not treated as

a factor lowering the quality of life by the visually impaired [5]. For example, Hollbrook [4] found a higher quality of life among individuals with the most severe form of visual impairment compared with those with less impaired sight.

However, one of the major problems of assessing the quality of life of individuals who are blind and visually impaired is the presence of coexisting illnesses and diseases [4, 6]. Research on visually impaired individuals presenting no diseases or complications (aged 18–65 years) found that most did not declare any encumbered difficulties with the ability to function independently or when performing activities of daily living [6]. However, research has shown that the quality of life of visually impaired women is lower than that of men with a similar loss of visual function [4, 6]. Furthermore, individuals who experienced vision loss before twelve years of age reported greater anxiety or depression than those who lost their sight later in life. A relationship was also found between a sedentary lifestyle and decreased life satisfaction among the blind and visually impaired [5]. A Dutch study demonstrated that individuals with vision impairment had a lower quality of life than healthy controls, although higher than patients after a stroke or with post-viral fatigue syndrome [6]. This study also found that the blind and visually impaired group, when compared with individuals suffering from various types of chronic illnesses, ranked themselves in the middle for such aspects as mobility, activities of daily living, anxiety, and depression [6]. However, vision loss has undeniably a greater impact on quality of life than type II diabetes, acute coronary syndrome,

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or hearing impairments, although it is considered to be less debilitating than a brain stroke, multiple sclerosis, post-viral fatigue syndrome, or mental disorders [6].

Studies on the life satisfaction of individuals with disabilities in Poland, and not just those with vision impairment, are rare. The available literature on the subject finds research conducted on only five different groups of individuals with a disability, all using the same research tool developed by Fugl-Meyer et al. [7]. The highest level of satisfaction with life was declared by women after mastectomy [8], followed by individuals with multiple sclerosis (MS) [9], those with rheumatoid arthritis (RA) [10], individuals with a spinal cord injury (SCI) [11], and those who suffered a stroke [12]. Consistent results were noted across all of the above studies, with disabled Polish individuals declaring family life and friendship as the most satisfactory, while rating their professional and financial situation as the least satisfactory [8–12]. However, no mention or reference was found to the level of satisfaction with life of Poles who are blind and visually impaired.

The lack of domestic research on the level of PA and life satisfaction of individuals with a visual impairment were the main motivational factors for the developing the present study. The purpose was to assess the PA levels and subjective quality of life (life satisfaction) of blind and visually impaired individuals living in Poland and search for potential differences in terms of their (daily) physical activity level (PAL). It was expected that those with high levels of PA in this sample would be more satisfied with their lives than those characterized by low PA.

Material and methods

Participants for the study were recruited with the help of the Polish Association of the Blind as well as by peer referral. Invitations to take part in the study were sent by email. Individuals who agreed to participate had the following inclusion criteria: to be medically diagnosed as visually impaired (significant, moderate, or light impairment) and at least 18 years of age. This resulted in a sample of 82 blind and sight impaired individuals (39 women and 43 men, mean age 38 ± 12.1 years; 79% declared to have significant visual impairment). The participants were asked to complete a three-part online questionnaire on their computer using screen reader software.

They were first asked to complete a personal questionnaire, which contained seven questions on demographic data such as gender, data of birth, marital status, current place of residence, address, education, and employment history (see Tab. 1). An additional question was included asking when vision loss was experienced and its severity.

The other two electronic questionnaires consisted of the following research instruments:

- 1) International Physical Activity Questionnaire (IPAQ) – Polish version [13], a short form version

Table 1. Demographic data of the participants

Demographic	Sample ($N = 82$)	
	n	(%)
<i>Education*</i>		
Elementary	2	(2.4)
Vocational	5	(6.1)
Secondary	23	(28.0)
Professional schooling	11	(13.4)
Bachelor's degree	3	(3.7)
Master's degree	36	(43.9)
<i>Place of residence</i>		
City	33	(40.2)
Village	6	(7.3)
Capital of a province	43	(52.4)
<i>Marital status</i>		
Single	32	(39.0)
Married	29	(35.4)
Divorced	8	(9.8)
Widow/widower	2	(2.4)
Non-marital relationship	11	(13.4)
<i>Occupation*</i>		
Student	8	(9.8)
Employed	54	(65.9)
Homemaker	9	(11.0)
Unemployed	9	(11.0)

* missing data ($n = 2$)

of the original IPAQ that contains seven questions on the types of PA an individual performs in an average day. It measures PA in terms of its duration and intensity. All PA (lasting at least 10 minutes) that is performed during work, at or around the home, when commuting, and for leisure as a form of recreation is taken into consideration. Information is also collected on the intensity at which PA is performed, such as the time spent sitting, walking, and performing PA at vigorous and moderate intensities. This allows total daily energy expenditure to be estimated by using the Metabolic Equivalent of Task (MET), i.e., the energy cost of an activity expressed as the ratio of its metabolic rate to 1 MET, or the amount of oxygen consumed at rest (resting metabolic rate, about 3.5 ml O_2 /1 kg body mass/min). Energy expenditure for different types of PA, according to the IPAQ, is: walking = 3.3 MET, moderate-intensity activity = 4.0 MET, and vigorous-intensity activity = 8.0 MET. This allowed the participants to be classified into one of three PA levels. Highly active individuals were those who met one of two criteria: (1) three or more days performing vigorous-intensity activity with a total MET value of at least 1500 MET/week, (2) seven or more days of any combination of PA (walking, moderate or

vigorous PA) exceeding 3000 MET/week. Minimally active individuals were those who met one of three criteria: (1) three or more days of vigorous PA of at least 20 minutes per day, (2) five or more days of moderate-intensity activity or walking at least 30 minutes per day, (3) five or more days of any combination of activity (walking, moderate or vigorous PA) exceeding 600 MET/week. Insufficiently active individuals were treated as those who did not perform any PA or did not meet the criteria for either of the two above categories. The IPAQ has been verified as a reliable and accurate instrument and has been used to study able-bodied populations in various countries [2, 14–16], including Poland [17].

- 2) Life Satisfaction Questionnaire (LiSat-9) [7], an instrument used to measure satisfaction as a whole and in eight different life domains, being: self-care ability, leisure situation, vocational situation, financial situation, sexual life, partnership relations, family life, and contacts with friends. Each item is scored on a six-point scale, from 1 (very dissatisfied) to 6 (very satisfied). The recommendation to score the total score (Life Satisfaction Index) as the mean of all eight domains of life, excluding the scale measuring “satisfaction with life as a whole”, was followed [18], where satisfaction with life as a whole has been positively correlated with the eight life satisfaction domains. Concerning the LiSat-9’s reliability and validity, it has been extensively used in general population studies as well as on individuals with a disability, such as those with MS, RA, SCI, or after a stroke or mastectomy [7–12], with Cronbach’s alpha from 0.74 to 0.83 [8–10, 12].

Basic descriptive statistics were used to analyze the data included calculating frequency (N), percent (%), arithmetic mean (\bar{x}), standard deviation (SD), and minimum (Min) and maximum (Max) values. Differences in terms of sex were calculated using the Chi-squared test. Due to the normal distribution of the Life Satisfaction Index, analysis on the differences in PAL was performed with univariate analysis of variance (ANOVA) and the Bonferroni correction. All statistical analysis was performed using SPSS ver. 14.0 software (IBM, USA).

Results

The amount of PA the blind and visually impaired participants performed per week (broken down in terms of intensity: walking, moderate intensity, and vigorous intensity) is presented in Table 2. The mean amount of PA performed, in MET/week, for each intensity, was: vigorous-intensity activity ($\bar{x} = 9438.16 \pm 9218.33$), moderate-intensity activity ($\bar{x} = 1921.85 \pm 1213.88$), and walking ($\bar{x} = 693.56 \pm 795.59$), with mean weekly energy expenditure for all participants to be 4011.25

Table 2. Amount and type of physical activity performed by the participants

Type of physical activity	Days/week (mean)	Minutes/week (mean)	MET/week (mean)
Vigorous	1.18	212.92	9438.16
Moderate	1.74	187.39	1921.85
Walking	5.75	925.36	0693.56

Table 3. Differences in the physical activity levels based on sex

Physical activity level	Women (n = 39)		Men (n = 43)		Total	
	n	(%)	n	(%)	n	(%)
Highly active	21	(53.8)	21	(48.8)	42	(51.2)
Minimally active	10	(25.6)	13	(30.2)	23	(28.0)
Inactive	8	(20.5)	9	(20.9)	17	(20.7)

Table 4. Mean results for life satisfaction in the different domains of life

LiSat-9	M ± SD
Life as a whole	4.33 ± 1.08
Self-care ability	5.42 ± 0.77
Leisure situation	4.13 ± 1.16
Vocational situation	3.89 ± 1.44
Financial situation	3.70 ± 1.26
Sexual life	3.80 ± 1.64
Partnership relations	4.13 ± 1.73
Family life	4.27 ± 1.27
Contacts with friends	4.44 ± 1.12
Life Satisfaction Index	4.23 ± 0.82

± 3742.60. In order to better illustrate the PA performed by the participants, the mean number of days per week as well as the mean number of minutes per week spent on PA at each intensity was calculated, finding that the largest amount of days ($\bar{x} = 5.75$) and minutes ($\bar{x} = 925.36$) per week were spent on walking (Tab. 2).

Based on the amount and type of PA performed, it was found that the majority of the participants were classified as highly active individuals (Tab. 3). No significant differences were noted in PA in relation to sex (Chi-square = 0.256, $p = 0.88$).

In terms of happiness, the blind and visually impaired participants self-reported their life satisfaction (as a whole) somewhere between (4) and (5) or “rather satisfied” and “satisfied”, respectively (Tab. 4). They also scored other domains of life similarly, such as leisure situation, partnership relations, family life, and contacts with friends. The participants reported they were the most satisfied with their self-care ability, scoring between (5) and (6) or “satisfied” and “very satisfied”,

Table 5. Differences in life satisfaction depending on physical activity level

LiSat-9	Physical activity level			ANOVA (<i>F</i>)	Significance (<i>p</i>)
	Highly active (<i>n</i> = 42)	Minimally active (<i>n</i> = 23)	Inactive (<i>n</i> = 17)		
	<i>M</i> ± <i>SD</i>				
Self-care ability	5.54 ± 0.67	5.26 ± 0.68	5.35 ± 1.05	1.02	0.365
Leisure situation	4.55 ± 1.01	3.87 ± 0.92	3.47 ± 1.42	6.79	0.002
Vocational situation	4.08 ± 1.30	4.18 ± 1.33	3.06 ± 1.65	3.67	0.030
Financial situation	3.76 ± 1.07	3.96 ± 1.26	3.19 ± 1.60	1.89	0.157
Sexual life	3.80 ± 1.66	3.77 ± 1.66	3.81 ± 1.68	0.03	0.997
Partnership relations	4.35 ± 1.61	4.09 ± 1.77	3.63 ± 1.96	1.01	0.369
Family life	4.52 ± 1.11	4.26 ± 1.32	3.65 ± 1.41	3.04	0.053
Contacts with friends	4.67 ± 1.00	4.30 ± 1.26	4.06 ± 1.12	1.99	0.143
Life Satisfaction Index	4.41 ± 0.71	4.22 ± 0.84	3.80 ± 0.95	3.55	0.033

respectively. The least satisfaction was felt with their financial situation.

The highest life satisfaction was declared by those who were grouped as being highly active (Life Satisfaction Index = 4.40). In the case of those who were physically inactive (the lowest PA level) had a Life Satisfaction Index of 3.79 (Tab. 5). Differences in the Life Satisfaction Index of the blind and visually impaired participants based on their PAL were statistically significant ($F_{(2, 79)} = 3.55$; $p \leq 0.05$). Those with high PAL had significantly higher life satisfaction than those with insufficient PAL (inactive). No statistically significant differences were noted in the life satisfaction of participants with minimal PAL and those who were inactive. In relation to satisfaction in the individual life domains, significant differences were found for leisure situation ($F_{(2, 77)} = 6.79$; $p \leq 0.01$) and vocational situation ($F_{(2, 73)} = 3.67$; $p \leq 0.05$) and PAL. Those who were highly active had significantly higher life satisfaction in leisure situation than those who were inactive. For vocational situation, the participants who were highly active or featured minimal PAL were significantly more satisfied with this life domain than those who were inactive.

Discussion

The main objective of the present study was to assess the PAL and life satisfaction in a blind/visually impaired Polish sample and examine the relationships between these variables. Surprisingly, it was found that 51.2% of the participants were classified as having high PAL (highly active). For comparison, a study on the population of Poland found that only 33.5% of the respondents declared themselves to be highly active [17]. Paradoxically, one reason for this may be that active blind/visually impaired individuals (66% of the participants were employed; 10% were studying) are forced to engage in more PA precisely because of their disability. Unable to perform such tasks as driving, which is known to con-

tribute to a sedentary lifestyle, this group must walk and use public transportation more often than those who are able-bodied. Another cause for such a large discrepancy may have been the methodology. The population study was conducted in the form of a personal interview, while this study made use an online questionnaire that the respondents completed themselves, which may have exaggerated the presented results [19]. A literature review of the various studies on using the IPAQ to measure PAL found a general recommendation to use this tool in the form of an interview, i.e., such as a telephone poll or a face-to-face survey [15, 19, 20]. The most important problem appears to be clarifying to respondents what are the differences between vigorous- and moderate-intensity PA as well as drawing attention to the fact that such activities as walking need to be performed for 10 minutes without interruption.

Average energy expenditure for this group of blind and visually impaired individuals, as measured by the short form IPAQ, was 4011.25 MET over a period of seven days. For comparison, a telephone poll was performed on randomly selected individuals with the same research tool in eight European Union countries, finding average energy expenditure to be 5605.94 MET (Tab. 6) [2]. The results of this study were similar if not in some cases higher than those found in this sample of able-bodied individuals across Europe. For example, the amount of PA performed by this group of blind/visually impaired individuals was similar to the mean PA of the population of Spain (4175.91 MET) and higher than that measured in Italy (2617.33 MET) and Great Britain (3238.31 MET).

The number of days of vigorous- and moderate-intensity PA was lower than the mean of most of the studied European Union countries. This was similar in the case of the mean number of minutes of vigorous- and moderate-intensity PA (Tab. 6). However, the number of days spent by this sample walking once per day for at least 10 minutes in a seven-day period (5.75 days) was very

Table 6. Comparison of the amount and type of physical activity performed between the participants of this study and the able-bodied populations of eight EU countries [2]

Country	Mean MET/ week*	Vigorous intensity		Moderate intensity		Walking	
		Mean MET days/week	Mean MET min/week	Mean MET days/week	Mean MET min/week	Mean MET days/week	Mean MET min/week
Total (<i>n</i> = 4995)	5605.94	1.79	281.73	2.76	318.74	5.72	600.31
Belgium (<i>n</i> = 611)	7105.80	1.96	333.12	2.82	388.99	5.67	880.27
Finland (<i>n</i> = 603)	6999.52	2.46	435.49	2.87	405.63	5.46	588.67
France (<i>n</i> = 599)	6686.05	1.88	308.45	2.22	307.43	5.77	794.80
Germany (<i>n</i> = 653)	8534.21	2.89	500.31	3.72	526.82	5.90	698.36
Italy (<i>n</i> = 600)	2617.33	1.15	84.63	2.67	191.73	5.29	355.80
The Netherlands (<i>n</i> = 606)	5543.95	1.42	233.81	3.57	310.50	5.99	697.39
Spain (<i>n</i> = 600)	4175.91	1.08	197.31	2.04	210.95	6.45	482.94
Great Britain (<i>n</i> = 723)	3238.31	1.44	158.25	2.10	203.04	5.18	322.71
Blind/visually impaired	4011.25	1.18	212.92	1.74	187.39	5.75	925.36

* Mean energy expenditure for a period of seven days for all types of PA

Table 7. Comparison of life satisfaction in various life domains among individuals with a disability

LiSat-9	Mastectomy [8]	MS (<i>n</i> = 30) [9]	RA (<i>n</i> = 42) [10]	SCI (<i>n</i> = 1034) [11]	Stroke (<i>n</i> = 25) [12]	Visually impaired (<i>n</i> = 82)
Life as a whole	4.30	4.23	4.05	3.72	3.52	4.33
Self-care ability	4.85	4.37	3.76	4.04	3.80	5.42
Leisure situation	4.44	4.50	3.90	3.75	3.76	4.13
Vocational situation	3.18	3.75	2.40	2.51	2.76	3.89
Financial situation	3.10	3.13	3.05	2.66	3.24	3.70
Sexual life	3.70	4.30	3.13	2.72	2.86	3.80
Partnership relations	4.44	4.74	3.72	3.66	4.13	4.13
Family life	4.86	4.67	4.98	4.42	4.60	4.27
Contacts with friends	4.96	4.50	4.83	4.38	3.92	4.44

similar to mean value of all eight EU countries (5.72 days). This result was even more discernible when the amount of time spent walking was calculated as the number of minutes in a week, with the blind/visually impaired group's mean higher by one third than the European norm (925.36 vs. 600.31 minutes, respectively) [2]. This difference may have been caused, as mentioned earlier, by how this group commutes every day. For individuals with a visual disability, walking is considered to be the most accessible form of PA that can be performed without relying on the help of others.

The study found that blind and visually impaired Poles rated their life as being rather satisfying (life as a whole = 4.3), which is similar to the overall life satisfaction levels found in women after mastectomy (4.3) and individuals with SM (4.2) [8, 9]. The present group was characterized by a higher level of life satisfaction than those with RA (4.1) or who had suffered a stroke (3.5) [10–12]. All of the above-mentioned studies were also conducted in Poland also used the LiSat-9 scale [8–12]. It was found that the self-care ability, vocational situation, and financial situation domains of the visually

impaired were similar to that of other disabled individuals. However, satisfaction with family life was evaluated the lowest by this group when compared with other individuals with a disability (Tab. 7).

This study also found differences in the Life Satisfaction Index and satisfaction in the domains of leisure situation and vocational situation with PAL. Generally speaking, those who were highly active were more satisfied in these domains of life than those who were inactive. This may stem from the fact that being more physically active allows individuals to engage in more attractive forms of leisure as well as participate in more rewarding forms of work.

The present study did have some limitations that need mentioning, including certain restrictions in choosing the original sample that may have influenced the obtained results. First of all, the study sample was composed of individuals who volunteered to participate in the study by electronic means and had to have access to a computer with an installed screen reader, which may have reduced the study's representativeness. Secondly, the questionnaire was self-reported, which may have

caused some of the responses to be exaggerated due to the natural tendency of wanting to present oneself in the best possible way. As a result, future studies should at least be extended to blind and visually impaired individuals without access to the Internet or a computer and preferably conducted in person. In addition, it would be worthwhile for subsequent research to expand the amount of collected demographic data, such as including information regarding income. This would allow for a direct comparison of an individuals' actual financial situation to their declared satisfaction level in this life domain. The subjective assessment of one's financial situation may be in fact quite different from their true financial situation, and this aspect undoubtedly has a role in what types of PA a blind and visually impaired individual can participate in. An additional element that may prove to be very useful in verifying the amount of self-reported PA would be the use of a pedometer [21, 22], which would allow for a broader comparison of the results with those by other authors. An interesting aspect would be to also compare the everyday PA and life satisfaction of blind and visually impaired individuals who practice intensive sports such as Goalball or tandem cycling [23, 24].

Conclusions

1. More than half of the blind/visually impaired participants were found to be highly active (52.2%).

2. Their subjective rating of their life satisfaction found them to be "rather satisfied" with life. The highest satisfaction level was reported in the life domains of self-care ability, while the lowest for financial situation and sexual life.

3. Those who were highly active (high PAL score) had significantly higher life satisfaction than those who were inactive (low PAL score). No statistically significant differences were noted in the life satisfaction of participants with minimal PAL or those who were inactive.

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