PRACA ORYGINALNA

ROLA CZYNNIKÓW SOCJODEMOGRAFICZNYCH ORAZ KLINICZNYCH W SUBIEKTYWNEJ OCENIE JAKOŚCI ŻYCIA MŁODZIEŻY CHORUJĄCEJ NA NADCIŚNIENIE TĘTNICZE

THE ROLE OF SOCIODEMOGRAPHIC AND CLINICAL FACTORS IN THE SUBJECTIVE QUALITY OF LIFE ASSESSMENT AMONG ADOLESCENTS WITH HYPERTENSION

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STRESZCZENIE

Cel. Celem pracy była subiektywna ocena jakości życia młodzieży ze zdiagnozowanym i leczonym nadciśnieniem tętniczym oraz identyfikacja wybranych czynników socjodemograficznych i klinicznych mających istotny wpływ na ocenę jakości życia pacjentów.
Materiał i metody. Badaniem prospektywnym, przekrojowym objęto 1930 pacjentów, spośród których w oparciu o ściśle określone kryteria włączania i wyłączania pacjentów z badania wybrano docelową grupę badaną, składającą się z 62 pacjentów (42 mężczyzn, 20 kobiet) w wieku od 16-18 r. ż. Grupę kontrolną, odpowiednią pod względem wieku i liczebności, stanowiły osoby zdrowe. W przeprowadzonym badaniu zastosowano standaryzowany kwestionariusz ogólnej oceny jakości życia- KIDSCREEN- 27 oraz specyficzny objawowy- cześć A kwestionariusza- Health Status Index w polskiej wersji językowej.
Wyniki. Jakość życia osób z nadciśnieniem tętniczym pierwotnym była znamiennie niższa w aspekcie domeny zdrowia fizycznego i psychologicznego kwestionariusza KIDSCREEN-27 w porównaniu do poziomu jakości życia osób zdrowych (mediana: 78 vs 75 p< 0,05). Wśród pacjentów z nadciśnieniem tętniczym jakość życia płci męskiej była znamiennie niższa, aniżeli płci żeńskiej. Wykazano istnienie ujemnej korelacji między poziomem ogólnej jakości życia pacjentów, a wartościami ciśnienia tętniczego skurczowego i rozkurczowego, wskaźnikiem masy ciała oraz ilości występujących objawów niepożądanych w przebiegu nadciśnienia tętniczego wśród młodzieży.
Wnioski. Nadciśnienie tętnicze znamiennie upośledza jakość życia młodzieży w kontekście domeny zdrowia fizycznego i samopoczucia psychologicznego. Ocena jakości życia pacjentów z nadciśnieniem tętniczym zależna jest od czynników socjodemograficznych jak i klinicznych, istnieje zatem potrzeba multidyscyplinarnego podejścia do problematyki związanej z terapią nadciśnienia tętniczego wśród młodzieży.

Słowa kluczowe: jakość życia, młodzież, nadciśnienie tętnicze, czynniki kliniczne, czynniki socjodemograficzne.

ABSTRACT

Aim. The studies were aimed at evaluation of hypertension's impact on adolescents' quality of life and identification of sociodemographic and clinical factors significantly affecting the evaluation.
Methods. The cross-sectional prospective study included 1930 patients with hypertension, of which the target study group has been created on the basis of strictly defined inclusion and exclusion criteria, including 62 patients (42 men, 20 women) aged 16-18. The control group consisted of 62 healthy individuals. The study was conducted using a standardized general quality of life assessment questionnaire – KIDSCREEN-27 – and the specific symptomatic questionnaire – Health Status Index section A in the Polish language.
Results. Quality of life in patients with primary hypertension was significantly lower in terms of the physical well-being and psychological well-being domains of the KIDSCREEN-27 questionnaire as compared to the control group (median: 75 vs. 78 p <0.05). Among hypertensive patients, quality of life in males was significantly lower than in females. In addition, a negative correlation was shown between the level of overall quality of life and systolic and diastolic blood pressure, body mass index and the number of adverse events occurring in adolescents in the course of hypertension.
Conclusions. Hypertension significantly impairs the quality of life among adolescents in the physical well-being and psychological well-being domains. Evaluation of quality of life in hypertensive patients depends on both sociodemographic and clinical factors; therefore, a multidisciplinary approach to the issues associated with hypertensive treatment in adolescents is necessary.

Keywords: quality of life, adolescents, hypertension, clinical factors, sociodemographic factors.

Introduction

Hypertension (HTN), due to its high prevalence, poor detection, effectiveness of treatment, and high risk of complications from the cardiovascular system, is an important health, social and economic problem [1].

In recent years, with the progress of civilization and lifestyle changes (consumption of high-calorie and high salt content foods, and sedentary lifestyle) HTN is increasingly often diagnosed in the population of young people, posing a growing problem of the developmental age [2]. Preva-

lence of HTN (blood pressure above the 95th percentile) among the general population of adolescents aged 11-17 is currently estimated at 3,2% and of prehypertension at 15,7% of the population. Extensive epidemiological studies have shown clearly that the prevalence of HTN among adolescents in any country depends on the percentage of obese children. Overweight and obesity is a major factor predisposing to the development of HTN [3, 4].

At present, quality of life assessment studies are an effective method of a multi-dimensional assessment of the patient's health. According to Schipper's definition, health-related quality of life is a functional effect of the disease and its treatment, subjectively or objectively perceived by the patient [5]. Measurement of health-related quality of life is particularly important in patients under long-term medical care due to a chronic disease where the determinants of the therapy's efficacy include: reduced severity of the diseases symptoms, slower disease progress, normalization of biochemical parameters, reduced risk of complications and improvement of the patient's daily functioning. Therefore, modern medicine assesses the efficacy of the health technology used not only on the basis of objective indicators (medical opinion, results of laboratory and diagnostic tests, years of life gained), but also on the basis of subjective indicators (individual opinion of the patient expressed by quality of life measurement). In the hypertensive therapy, health-related quality of life studies are helpful in individualized choice of treatment, thus contributing to an improvement of the doctor-patient relationship, which leads to improved efficacy of treatment [6, 7].

According to the multidimensional quality of life concept, its evaluation is determined by a number of factors. Professional references attribute the most important role to clinical factors (biochemical parameters, the number of drugs used, co-morbidities, adverse effects of drugs), sociodemographic factors (age, sex, education, socioeconomic status), and psychosocial resources (marital status, extent of interactions and social relationships) [8, 9].

Issues related to the assessment of quality of life and identification of sociodemographic and clinical factors that have a significant impact on the assessment of patients with hypertension have been very well explored and described for adult population [10, 11, 12]. So far, the problem of HTN and assessment of quality of life in the population of young people has been treated marginally in the scientific literature. In the design of research on subjective assessment of the quality of life of children and adolescents, it is extremely important to choose the appropriate research instrument (questionnaire), adapted to the study objective, age and development of the study group [13].

The studies were aimed at evaluation of hypertension's impact on adolescents' quality of life, identification of sociodemographic factors (sex, place of residence) and clinical factors (body mass index (BMI), systolic and diastolic blood pressure values, comorbidities, type of antihypertensive therapy applied, adverse events in the course of HTN) significantly affecting the evaluation.

Methods

Study population

The prospective study included 1,930 patients consecutively visiting the selected health care facility for diagnosis and treatment of diseases, over the time of two years (2010, 2011). Of this group, 62 patients in developmental age (16-18 years old) with a diagnosed and treated primary hypertension were included in the study on subjective quality of life assessment, based on the inclusion and exclusion criteria described below. Each of the eligible study participants before proceeding to surveying was informed of the study objective and conditions and gave a written informed consent to participation in the study. The research project received approval of the local ethics committee.

The number of subjects in the corresponding age control group (healthy individuals) was the same as in the study group (62 persons).

Inclusion criteria in the study:

- age of 16-18;
- primary hypertension diagnosed according to the ICD-10 classification;
- diagnosed HTN treated for at least 3 months;
- patient's consent to participation in the study.
- no complications from the cardiovascular system (left ventricular hypertrophy, ophthalmological and nephrological lesions).

Exclusion criteria in the study were:

- lack of patient's consent to participation in the study;
- age under 16 and above 18;
- pending diagnosis of hypertension;
- diagnosed secondary hypertension;
- diagnosed HTN treated for less than 3 months.
- complications from the cardiovascular system (left ventricular hypertrophy, ophthalmological and nephrological lesions).

Study technique

The study tools were a standardized overall quality of life assessment questionnaire - KIDSCREEN-27 [14] – and the

specific symptomatic questionnaire – Health Status Index [15] in the Polish language.

KIDSCREEN-27 is an overall quality of life assessment questionnaire for children and adolescents aged 8-18. The survey features 27 questions concerning 5 dimensions of the quality of life: physical well-being, psychological well-being, autonomy & parents, peers & social support, and school environment. Answers are given for the most recent week according to standardized 5-degree categories of frequency (never, seldom, quite often, very often, always) or intensity (not at all, slightly, moderately, very, extremely). Calculation and interpretation of the results were based on a generally accepted key, taking raw score as the sum of the points on a scale by scoring responses from the least to the most favorable (0 to 4 points); thus, high score means high quality of life. The raw score would then be transformed into a standardized one on the scale of 0 to 100 points.

To identify the selected sociodemographic factors (sex) and clinical factors (body mass index- BMI), systolic and diastolic blood pressure values, comorbidities, type of antihypertensive therapy applied) the patients and their managing physicians were asked to fill in the study questionnaire developed for surveying purposes.

The study was aimed at assessing the type and frequency of adverse events reported in the course of hypertension was based on a questionnaire, which was developed based on the first section of the standardized specific quality of life questionnaire - Health Status Index (HSI). The questionnaire comprises 26 questions on the most frequent complaints reported by patients with HTN over the last month. The answers to most of the questions are given in a simple way by using a binary scale: yes/no. Each response was scored on a scale of 0-1, where 0 indicates the presence of a particular symptom, and 1 – absence of the symptom. The raw score (sum of points) would then be converted into a percentage result. The maximum overall score in the test was 1 (100%) means the best quality of life (no symptoms associated with hypertension).

Statistical analysis

Comparative analysis of the overall quality of life between the study and the control group was performed using the Mann-Whitney U-test.

Analysis of the level of overall quality of life, depending on the sex, was performed using the Mann-Whitney U-test.

Analysis of dependence of overall quality of life on the respondents' systolic and diastolic blood pressure values, age and body mass index was assessed using Spearman's rank correlation.

Analysis of dependence of overall quality of life on quality of life assessment using specific symptomatic questionnaire was performed using Spearman's rank correlation.

Analysis of the level of overall quality of life, depending on the type of therapy applied, was performed using Kruskal-Wallis test.

Test probability of $p<0.05$ was considered significant and test probability of $p<0.01$ was considered highly significant.

Results

General comparative characteristics of the analyzed groups (study vs control) are shown in **Table 1**.

Table 1. Comparative characteristics of subjects with primary hypertension (n = 62) and control group subjects (n = 62)

Variables	Study group	Control group	Statistical significance level [p*"]
Population			
Overall	**62**	**62**	**NS"**
Women (%)	**20 (32.26)**	**30 (48.39)**	**NS**
Men (%)	**42 (67.74)**	**32 (51.61)**	**NS**
Age (years)			
Total ($\overline{X}$ ± SD*)	**17.04 ± 0.81**	**17.45 ± 0.68**	**0.0051**
Education			
Primary (%)	**100 (100)**	**100 (100)**	**NS**
Source of income			
Supported by parents (%)	**100 (100)**	**100 (100)**	**NS**
BMI (kg/m^2)			
Total ($\overline{X}$ ± SD)	**25.4 ± 4.7**	**20.7 ± 3.2**	**< 0.001**
BMI <85th percentile	**32 (51.7)**	**54 (87.2)**	**< 0.001**
BMI ≥ 85th<95th percentile	**17 (27.4)**	**6 (9.6)**	**< 0.001**
BMI >95th percentile	**13 (20.9)**	**2 (3.2)**	**< 0.001**

$\overline{X}$ ± SD*– Mean ± Standard Deviation

NS**. No significance

p***– level of statistical significance; p<0,05 was considered statistically significant.

Analyzed groups: study group (adolescents with hypertension) and control group (normotensive patients) differed statistically significantly in terms of age (p= 0.0051) and body mass index (p< 0.001). Control group subjects were slightly older than the study group subjects. On the other hand, among adolescents with a diagnosed and treated hypertension there were significantly more overweight (27.4% vs 9.6%) and obese individuals (20.9% vs 3.2%) compared to the control group. The two groups did not differ significantly in terms of size, level of education and source of income. Subjects in both analyzed groups had primary education and were supported by their parents.

Detailed clinical characteristics of the study group are shown in **Table 2**.

Table 2. Clinical characteristics of the study group (n=62) as per sex

Variables	MEN	WOMEN	Statistical significance level [p***]
Number (%)	42 (67.74)	20 (32.26)	< 0.001
Age in years ($\overline{X}$ ± SD*)	17.2 ± 0.8	16.7 ± 0.9	p<0.05
BMI – body mass index (kg/m^2): Total ($\overline{X}$ ± SD)	25.9 ± 4.8	24.3 ± 4.1	NS**
Normal body mass - BMI< 25 kg/m^2 (%)	20 (47.7)	12 (60)	NS
Overweight – BMI: 25-29.9 kg/m^2 (%)	13 (30.9)	5 (25)	NS
Obesity – BMI ≥ 30 kg/m^2 (%)	9 (21.4)	3 (15)	NS
Duration of hypertension in years ($\overline{X}$ ± SD)	2.3 ± 1.2	1.9 ± 1.1	NS
Hypertension ($\overline{X}$ ± SD) Systolic blood pressure (Hg mm)	145 ± 15	144 ± 16	NS
Diastolic blood pressure (Hg mm)	89 ± 9	91 ± 10	NS
Type of antihypertensive therapy applied: Non-pharmacological only (%)	14 (33.3)	15 (75)	< 0.01
Monotherapy (%)	16 (38.1)	4 (20)	NS
Polytherapy (%)	12 (28.6)	1 (5)	NS
Controlled hypertension < 95th percentile (%)	15 (35.7)	6 (30.0)	NS
Comorbid conditions: dyslipidaemia (%)	6 (14.3)	2 (10)	
type II diabetes (%)	1 (2.1)	1 (5)	NS
bronchial asthma (%)	7 (14.8)	0 (0)	

$\overline{X}$ ± SD*– Mean± Standard Deviation
NS** – No significance
p***– level of statistical significance; p<0,05 was considered statistically significant

The study group comprised of 62 subjects (42 male and 20 female). The mean age of females was 16.7, and 17.2 for males. Significant differences between sexes were found in terms of: number (p< 0.001), age (p< 0.05) and type of antihypertensive therapy applied (p< 0.01). In the study group with a diagnosed and treated hypertension, male subjects evidently dominated (67.74%) over female subjects (32.26%). Moreover, male subjects in the analyzed study group were slightly older than the females (17.2 vs 16.7). Female subjects, in turn, received only non-pharmacological treatment statistically significantly more frequently compared to subjects of the opposite sex (75% vs 33.3% of the subjects). No significant differences between sexes were found in terms of: body mass index (BMI), duration of hypertension, systolic and diastolic blood pressure values, percentage of subjects with controlled hypertension (<95th percentile) and percentage of subjects with comorbidities.

Results of this study concerning subjective quality of life evaluation in adolescents diagnosed with and treated for primary hypertension have shown that the quality of life (all domains of the KIDSCREEN-27 questionnaire), regardless of the sex, is lower in hypertensive patients than in normotensive group of peers (**Table 3**). Significant differences in the level of quality of life among the analyzed groups concerned the physical well-being (p= 0.0275) and psychological well-being (p= 0.0042) domains of the KIDSCREEN-27 questionnaire.

Significant differences in the quality of life between the sexes were found. All scales of the KIDSCREEN-27 quality of life assessment questionnaire were significantly lower for male subjects of the study group with a diagnosed and treated hypertension than for female subjects (p< 0.05) (**Table 3**).

Table 3. Comparison of the quality of life between study group and control group subjects, and between sexes within the study group (n=62)

KIDSCREEN-27		Control group (n=62)	Study group (n=62)	P* value	Study group		P* value
Domains:					Women (n=20)	Men (n=42)	
physical well-being	Mean	79.76	70.08		82.45	64.19	
	Median	78	75	0.0275	80	65	< 0.001
	SD**	11.92	22.99		16.37	23.46	
psychological well-being	Mean	80.0	70.31		76.85	67.19	
	Median	78	75	0.0042	77	67	0.00523
	SD	12.02	19.1		16.99	19.44	
autonomy & parents	Mean	65.52	64.58		74	60.09	
	Median	68	68	0.96	75	61	0.014
	SD	11.94	19.07		17.32	18.38	
peers & social support	Mean	69.5	66.87		79	61.07	
	Median	69	69	0.9276	75	63	0.003
	SD	14.82	22.43		17.95	22.18	
school environment	Mean	68.84	68.24		76.7	64.21	
	Median	69	75	0.80	75	72	0.035
	SD	14.92	18.62		14.93	19.0	

p*– level of statistical significance; p<0.05 was considered statistically significant
SD**– standard deviation

Kruskal-Wallis test has shown that quality of life in the physical well-being, and autonomy & parents domains of the KIDSCREEN-27 questionnaire in adolescents suffering from hypertension depends on the type of therapy applied (**Table 4**). Patients receiving non-pharmacological treatment only had a significantly higher quality of life compared to patients receiving antihypertensive drugs concerned the physical well-being (p< 0.001) and auto-

nomy & parents (p< 0.05) domains of the KIDSCREEN-27 questionnaire.

Table 4. Quality of life in the study group, depending on the type of antihypertensive therapy applied (n=62)

KIDSCREEN-27		Type of antihypertensive therapy applied			P* value
Domains:		Non-pharmacological	Monotherapy	Polytherapy	
physical well-being	Mean	79.55	67.25	53.3	0.0002
	Median	88	70	50	
	SD**	23.84	17.50	18.43	
psychological well-being	Mean	75.17	66.40	65.46	0.0680
	Median	75	61	67	
	SD	19.31	21.43	12.18	
autonomy & parents	Mean	68.58	61.65	60.15	0.0387
	Median	71	63	58	
	SD	21.49	21.30	8.66	
peers & social support	Mean	72.03	64.70	58.69	0.1162
	Median	75	66	63	
	SD	22.57	24.23	17.13	
school environment	Mean	72.79	65.3	62.61	0.1023
	Median	75	75	63	
	SD	18.60	20.70	13.32	

p*– level of statistical significance; p<0.05 was considered statistically significant

SD**– standard deviation

Analysis of the effect of systolic and diastolic blood pressure values on the quality of life in the analyzed study group with a diagnosed and treated HTN, using Spearman's rank correlation, has shown a negative correlation with the analyzed variables. Quality of life, except for the autonomy & parents domain of the KIDSCREEN-27 questionnaire, would deteriorate with increasing systolic and diastolic blood pressure values (**Table 5**).

A similar phenomenon was observed by examining the impact of BMI on the quality of life among hypertensive adolescents. Quality of life in the domains of: physical well-being, psychological well-being, and school environment of the KIDSCREEN-27 questionnaire, would deteriorate with increasing BMI (**Table 5**).

Characteristic symptoms associated with HTN would be present in 66.2% of the subjects. The most commonly reported adverse events in the analyzed study group included: headache – 37.1% of respondents, drowsiness – 27.4%, dizziness – 25.8%, hot flushes of the face and neck – 25.8% , polyuria – 14.5%, and impaired concentration – 8.1% (**Table 6**).

Table 5. Quality of life in the study groups, depending on blood pressure values and body mass index (n=62)

KIDSCREEN-27		Variables		
Domains:		Systolic blood pressure	Diastolic blood pressure	BMI – body mass index
physical well-being	Spearman's rank	-0.439104	-0.333090	-0.393072
	P* value	0.000357	0.008160	0.001576
psychological well-being	Spearman's rank	-0.366342	-0.294238	-0.342449
	P* value	0.003407	0.020269	0.006440
autonomy & parents	Spearman's rank	-0.194628	-0.229434	-0.221100
	P* value	0.129557	0.072843	0.084175
peers & social support	Spearman's rank	-0.297619	-0.273046	-0.220151
	P* value	0.018810	0.031778	0.085550
school environment	Spearman's rank	-0.297622	-0.348185	-0.255770
	P* value	0.018809	0.005551	0.044807

p*– level of statistical significance; p<0.05 was considered statistically significant

Table 6. The most commonly reported adverse symptoms in the course of HT in the study group (n=62)

Symptoms	Overall percentage of patients [%]	Male subjects [%]	Female subjects [%]
Headaches	37.1	22.6	14.5
Dizziness	25.8	17.7	8.1
Drowsiness	27.4	24.2	3.2
Disturbed vision	8.1	8.1	0
Polyuria	14.5	12.9	1.6
Dryness in the mouth	8.1	4.8	3.3
Reduced concentration	8.1	6.5	1.6
Hot flushes in the face and neck	25.8	22.6	3.2
Skin itching	9.6	6.5	3.1

The conducted study found no statistically significant difference in the quality of life between sexes, assessed using HSI specific questionnaire. The overall value of the quality of life for women was: mean 0.94 ± 0.05 and for men: mean 0.91 ± 0.08 (p = 0.9456).

Correlation was shown between the overall quality of life index assessed using the HSI specific questionnaire, and the overall quality of life assessment in relation to the following domains: physical well-being and psychological well-being in the KIDSCREEN-27 questionnaire. With increasing number of adverse symptoms in the course of HTN, quality of life in respective domains of KIDSCREEN-27 would deteriorate (**Table 7**).

Table 7. Dependence between the overall quality of life index assessed using the KIDSCREEN-27 questionnaire, and the overall quality of life assessed using HSI – specific questionnaire

Quality of life		
KIDSCREEN-27 – overall questionnaire	HSI – specific questionnaire	
	Spearman's rank correlation	
Domains:	Spearman's rank	P* value
physical well-being	0.391938	0.001630
psychological well-being	0.251231	0.048878
autonomy & parents	0.081712	0.527804
peers & social support	0.111593	0.387859
school environment	0.140962	0.274475

p*– level of statistical significance; p<0.05 was considered statistically significant

Discussion

The study concerning the assessment of subjective quality of life among adolescents with diagnosed and treated hypertension have shown that the disease decreases the quality of life in terms of physical and psychological health, regardless of the sex. These results corroborate with studies by other authors [16, 17]. Studies conducted by German scientists from the Institute of Social and Family Medicine on a population of more than 1,000 people aged 15-89, using a standardized health-related quality of life questionnaire – SF-36, have also shown significantly lower levels of quality of life among hypertensive patients compared to the reference group in the physical health domain [16]. It is generally believed that the main reason for the lower level of quality of life among hypertensive patients depends on the impact of the disease on cognitive function of the study subjects [18]. Many large-scale population studies found that hypertensive patients are characterized by an increased susceptibility to emotional disorders (anxiety, depression) [19], poorer quality of sleep and impaired sexual functions [20]. According to many researchers, the main cause of the lower quality of life, in particular among adolescents with newly diagnosed hypertension, lies in the fact they are diagnosed with the disease, commonly called the "labeling effect" [21, 22]. Awareness of a chronic disease, such as HTN, is a phenomenon adversely affecting many aspects of functioning among maturing adolescents. This situation puts young patients to stress, often preventing satisfaction of all needs and is difficult to accept. A chronic disease, due to the need for long-term therapy, is an aggravating factor for young patients, and therefore is a significant risk to physical, emotional and social development of children and adolescents [23].

The study population of hypertensive patients was dominated by male subjects. Quality of life in male individuals from the study group was significantly lower in terms of the physical well-being, psychological well-being and social support domains of the KIDSCREEN-27 questionnaire as compared to young females. These results are corroborated in the studies by other authors [24].

In this age group, prevalence of hypertension is dominated by male adolescents because, as mentioned by many scientific reports, androgens trigger antihypertensive mechanisms causing a blood pressure increase. Estrogens in young women, on the other hand, owing to their vasodilatory action, counteract the adverse effect of androgens. Autonomous system also plays a major role in the HTN pathogenesis in adolescents. In young females, activity of the parasympathetic system is slightly higher and of the sympathetic system is lower than in males. Dominance of the parasympathetic nervous system's activity has a protective effect on the cardiovascular system [25, 26]. This difference wears away over the years and in women after menopause prevalence of hypertension is higher than in men because of the increasing dominance of the sympathetic nervous system, increasing peripheral resistance and heart rate. Furthermore, because of the protective vasodilatory effect of estrogens and dominance of the parasympathetic system over the sympathetic, HTN is milder in young women than in the opposite sex, giving a smaller feeling of lost health and deteriorated quality of life [24, 25].

In the analyzed study group of hypertensive adolescents, overweight or obese individuals were more frequent than in the normotensive group. Half of the subjects were overweight or obese. These results are consistent with the opinion of many experts that the main clinical symptom among adolescents diagnosed with and treated for HTN is excess of fat tissue leading to overweight and obesity [27]. This view is supported by many of the recent population-based studies. In a study conducted by Aullen included 800 hypertensive patients aged 10-18, of which also a half were overweight or obese [28].

Excessive weight adversely affected the respondents' quality of life. This phenomenon is supported by results of studies by other authors [29]. Overweight and obesity contributes not only to the development of many somatic diseases but of emotional disorders as well [30]. It has been proven that the population of children and adolescents with abnormal BMI is more frequently diagnosed with depression which also is more severe with higher BMI. In addition, it is believed that poor quality of life among people with abnormal body weight is due to low self-esteem resulting from the lack of self-acceptance and acceptance in the peer community. Wardle et al. conducted a study among children aged 4 to 11 and found that already small

children have a negative attitude towards obese peers [31]. A fact of an easier assimilation of children with congenital or acquired disability than of obese children has also been described [32]. Results of many studies published to date indicate that normalization of body weight among adolescents not only prevents the progression of hypertension but also reduces the risk of the resulting organ damage (left ventricular hypertrophy). It has also been shown that body weight reduction helps improve vitality, well-being and quality of life [33].

Level of quality of life of respondents differed significantly in terms of the type of antihypertensive therapy applied. The highest level of quality of life was observed among patients treated only non-pharmacologically, and the lowest among patients receiving combined drug therapy. These results are consistent with the opinion of many experts that among persons newly diagnosed with HTN pharmacotherapy does not always lead to improved quality of life [34]. HTN, especially in the early stages, is mild, causing a small number of symptoms. Implementation of drug therapy may contribute to deteriorated quality of life of the patients due to the risk of adverse effects typical for many antihypertensive drugs used [35, 36]. In addition to this, combined therapy requires particular discipline in regular drug taking from the patient, resulting in the patient's feeling of limitation and development of unwillingness to continue the therapy [37].

The conducted studies have found that the blood pressure values, both systolic and diastolic, are correlated with the respondents' quality of life. Quality of life for all domains of the KIDSCREEN-27 questionnaire would deteriorate with increasing systolic and diastolic blood pressure values. This fact is due to severity of the symptoms associated with the presence of HTN [38, 39]. Several studies have shown that effective treatment of HTN among adolescents leads to improved cognitive function, improved well-being and quality of sleep, which in turn results in improved quality of life of the patients [40].

Vast majority of adolescents with hypertension (66% of respondents) reported occurrence of specific adverse events in the course of HTN. The most common symptoms reported by the respondents included: headaches and dizziness, drowsiness, hot flushes of the face and neck, and impaired concentration. These results corroborate with studies by many other authors [41, 42, 43]. Many studies were published to date showing that in the course of HTN among adolescents cognitive function deteriorates, in the form of impaired short-term memory and concentration [41]. It was found that emotional disorders (anxiety, depression, irritability) were more common among adolescents with a diagnosed HTN compared to healthy peers. Moreover, these individuals were characterized by a poorer quality of sleep, and much more frequently complained about headaches and dizziness compared to healthy individuals [42, 43].

The presence of adverse effects was associated with lower overall quality of life in terms of physical and psychological health. In the opinion of many experts, occurrence of adverse effects in the course of antihypertensive therapy is one of the causes of its low efficacy. The number and type of adverse effects increased with the introduction of pharmacotherapy, and is clearly associated with the class of antihypertensive drugs (e.g. cough in patients treated with angiotensin convertase inhibitors). As a consequence, antihypertensive medications are used unsystematically and sometimes the treatment is discontinued soon after its launch. In the opinion of many experts, the first-choice drug is of key importance in improving the efficacy of the pharmacotherapy applied in a given group of patients [44].

Currently, studies on the quality of life assessment and identification of factors affecting this assessment among hypertensive adolescents are marginal among scientific references. Results of this study are innovative, being the first source of comprehensive knowledge on the issues of hypertension among adolescents.

Based on the conducted studies it can be concluded that HTN significantly impairs the quality of life of patients in developmental age, particularly in terms of physical and psychological health. Quality of life of adolescents diagnosed with and treated for primary HTN is determined by a number of factors, both sociodemographic (sex) and clinical (systolic and diastolic blood pressure values, body mass index, type of antihypertensive therapy applied, adverse events in the course of HTN). Therefore, a multidisciplinary approach to the issues associated with health-related quality of life of adolescents suffering from hypertension is necessary.

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