

Financing medical services in children with arterial hypertension within public health insurance

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Abstract

Background. Arterial hypertension in children and teenagers is more often perceived as an interdisciplinary problem. The subject literature most often presents reports concerning medical issues. Very rare are reports presenting the problem from the perspective of public health and economy.

Aim. The aim of the study was to analyse the burden imposed on public health insurance system by providing services due to hypertension in children and teenagers in Silesian Province.

Material and methods. In this paper, the data from the Database of Healthcare Services of the Silesian Regional Branch of National Healthcare Fund in 2013 and 2014 and MZ-11 reports were used.

Results. In Silesian Province, in primary healthcare units in 2013 hypertension was diagnosed in 19,317 patients aged 0–18 years, while in 2014 — in 18,173 patients. In 2013 the cost of services provided within specialist outpatient care due to hypertension amounted to 116,853 PLN (for 787 patients), while in 2014 — 130,384 PLN (for 804 patients). In the years 2013–2014 in clinical centres, 480 hospitalizations for 372 patients with hypertension were registered, while in the other hospital healthcare centres — 391. The value of services provided in hospital setting was 1,383,923 PLN in 2013 and 1,357,332 PLN in 2014. Essential hypertension (I10 according to ICD) in different clinical units was diagnosed in 86.33–88.29% of the hospitalized patients due to hypertension, while in other hospitals — in 93.86% of patients with hypertension.

Conclusion

1. Hospitalizations due to hypertension in patients aged 0–18 years generate the biggest financial burden for the payer for services.
2. Nearly half of hospitalizations were provided in academic centres.
3. The most numerous group of the hospitalized individuals were patients at the age of 15–18 who were diagnosed with essential hypertension.
4. The scope of services provided during hospitalization in clinical centre departments and regional hospitals significantly differs.

key words: hypertension, children, financing

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Introduction

Hypertension is more and more frequently perceived not only as a medical but also as a social and economic problem. According to WHO experts, hypertension is the main cause of death in the world and is considered the most widespread disease. In the 1970s it was claimed that hypertension was mainly a disease of adults and therefore routine blood pressure measurements in children were not performed. However, the exception was paediatric personnel in Johns Hopkins Hospital (Baltimore, USA), who introduced the measurement of blood pressure in children into clinical practice already at the beginning of the XX century.

Hypertension in the population of developmental age is found in 3–5% of children and teenagers and is increasing with age [1, 2]. The subject literature suggests that not only different diagnostic criteria were applied but also different methodology. Most studies, conducted to assess the frequency of hypertension in the developmental age, concern schoolchildren. Determining the frequency of hypertension in the population of children and teenagers is posing many difficulties resulting mainly from the fact that along child's development the values of blood pressure change, which indicates a relationship not only to age but also to gender and height. Moreover, a very important aspect is standardization of measurements which should involve, except the proper technique, also the appropriate frequency of performing it. Presently, the basis for diagnosing hypertension in children is constituted by the values > 95 percentile for gender, age, and height observed during three independent visits [3].

Hypertension in children and teenagers is more and more often the subject of studies not only for cardiologists and nephrologists but also for teams dealing with obesity, endocrinology, diabetology or metabolic syndrome. It is assumed that the values of hypertension in the early period of life are of crucial importance for shaping the values in later periods of life. In Poland, in 2006 more than 2.5 million of persons over 18 years of age were registered in primary care units with diagnosed hypertension and, what is more, the expenditure incurred on treatment during that period is estimated at 14 billion PLN a year [4]. There are no similar estimations in the population of the youngest.

The range of health care services, including screening tests, and the period when these studies are conducted in Poland are specified by the regulation of Minister of Health [5, 6].

Aim of the study

The aim of the study was to assess the burden imposed on public health insurance system by providing services due to hypertension in children in the Upper Silesia Province.

Materials and methods

In this study the information from the Database of Healthcare Services of the Silesian Regional Branch of National Healthcare Fund about the performance of contractual services in 2013 and 2014 was used. By using this source of data and reports about the activity of the healthcare units (MZ-11) the number of the insured individuals at the age of 0–18 years for the present year in the Upper Silesian Province who, due to hypertension, used primary care services, specialist outpatient care and hospital treatment was calculated. Next, the volume of funding for treatment of children, who were provided with primary care services, specialist outpatient care or hospital treatment was assessed.

Within public health insurance, financing medical services concerning hypertension treatment in children is performed in the following way:

Financing by per capita rate in the primary healthcare

Primary healthcare is a publicly available part of the healthcare system. Primary healthcare doctor may refer the patient to diagnostic tests but their range is strictly defined (laboratory tests, USG, X-ray). The tests from the list of guaranteed medical tests are financed within contractual services in the primary healthcare units. The primary care unit doctor by referring the patient to the specialist or to hospital is obliged to perform and attach the diagnostic tests results performed to confirm the initial diagnosis. If the primary care doctor receives the information from the specialist clinic or hospital about the diagnosis, treatment method and prescribed medications (including the information about ordered medicines and dosing), he/she may continue treatment and give the patient a prescription for the medicines taking into account the rules of drug reimbursement.

Financing services by assessment of particular medical advice in specialist clinics

Outpatient specialist services, which are given in specialist clinics, cover three main types of medical advice: post-hospitalized, comprehensive and specialist, which the payer differentiated in terms of assessment. In order to gain post-hospitalized advice the

Table 1. Total value of services in 2013–2014 including the type

Type of services	The value of services in 2013	The value of services in 2014
Primary care unit	Annual per capita rate	Annual per capita rate
Specialist Outpatient Clinic	116,853 PLN	130,394 PLN
Hospital treatment	1,382,923 PLN	1,357,332 PLN

patient who was hospitalized may, within thirty days counted from the hospital stay, go to the doctor from the team that was treating the patient during hospitalization. Specialist comprehensive advice is a service designed for patients who contact the specialist for the first time with a specified medical problem. In its course the diagnosis is made and further treatment is decided. If the patient uses specialist's advice again due to the earlier diagnosed disorder, the service is provided within the specialist advice.

Financing hospitalization at rates for diagnosis-related groups of patients

A patient can be referred to hospital treatment if the goal of treatment cannot be achieved in the outpatient mode.

According to the definition specified in the Regulation of Minister of Health, hospitalization is a scheduled or urgent 24-hour provision of guaranteed services covering the diagnostic and therapeutic process from the moment of benefit recipient's admission to the moment of his/her discharge or death. It covers the costs of performing the necessary laboratory tests, medical imaging, medicinal products and medical devices applied during the provision of the service [7].

Hospital stay as well as diagnostics and therapy of hypertension are financed according to the catalogue of services. After finishing hospitalization, the patient should obtain information sheet and, depending on the needs, prescriptions, medical leave and referral to further treatment. People under 18 years of age have a right for healthcare regardless of the fact whether they are insured or not. Financing the services within the public health insurance system does not take into account the division of the diagnostic process of hypertension. From the perspective of the payer, which is National Healthcare Fund, it precludes from compiling a separate calculation of direct and indirect costs.

The services performed in two multi-profile clinical hospitals with full diagnostic facilities were analysed due to the assumption that an important source of information depicting the expenditure incurred during hospitalization of children with hypertension may be medicinal units possessing properly special-

ized units and comprehensive diagnostic facilities. The analysis was limited to the department of paediatric cardiology and nephrology as well as paediatrics due to the fact that on different departments children with diagnosed hypertension were hospitalized only in a few cases. In order to determine the degree of involvement of these centres in the process of treatment and financing the services, the subject for analysis was constituted by other hospitals in Silesian Province, which have paediatric departments and in which children with hypertension were hospitalized. The assessment did not cover the cost of medicines due to the lack of possibility of conducting the analysis in this area.

Results

In 2013 in primary care units of the Silesian Province 19,317 patients at the age of 0–18 with diagnosed hypertension were registered, while in 2014 the number was 18,173. Taking into account the method of financing the services in primary care units (annual per capita rate) it is not possible to assess simultaneously the expenditure incurred by the payer on diagnosing and treatment of patients with a specified disease.

Within specialist outpatient treatment, due to hypertension in the age group of 0–18 in 2013, 787 patients were given medical advice, while in 2014 the number equalled 804 (Table 1).

In 2013–2014, in the selected clinical centres the total number of hospitalizations on paediatric cardiology and nephrology departments and paediatrics was 480 for 372 patients with hypertension (according to ICD-10; I10-I15). In this group 88% of hospitalizations were connected with the disease entity I10 — essential (primary) hypertension. The data analysis, concerning hospitalization of children diagnosed with hypertension proves that in the cardiological department the essential hypertension amounted to 86%, while in the department of paediatric nephrology — 88%. In paediatric department where 8 patients with hypertension were hospitalized, 7 of them were diagnosed with essential hypertension. The percentage proportion of hospitalization with

Table II. The percentage proportion of diagnoses I10-I15 (according to ICD-10) in patients hospitalized in clinical departments in 2013–2014

Scope of services	Code of diagnosis	Name of diagnosis	Number of hospitalizations	Percentage share
Paediatric cardiology	I10	Essential (primary) hypertension	120	86.33%
	I11.9	Hypertensive heart disease without (congestive) heart failure	1	0.72%
	I15.1	Secondary hypertension to other renal disorders	1	0.72%
	I15.8	Other secondary hypertension	15	10.79%
	I15.9	Secondary hypertension, unspecified	2	1.44%
Paediatric nephrology	I10	Essential (primary) hypertension	294	88.29%
	I15.0	Renovascular hypertension	5	1.50%
	I15.1	Secondary hypertension to other renal disorders	23	6.91%
	I15.8	Other secondary hypertension	5	1.50%
	I15.9	Secondary hypertension, unspecified	6	1.80%
Paediatrics	I10	Essential (primary) hypertension	7	87.50%
	I15.9	Secondary hypertension, unspecified	1	12.50%

Table III. The percentage proportion of diagnoses I10-I15 (according to ICD-10) in patients hospitalized in paediatric departments in other hospitals of Silesian Province in 2013–2014

Scope of services	Code of diagnosis	Name of diagnosis	Number of hospitalizations	Percentage share
Paediatrics	I10	Essential (primary) hypertension	367	93.86%
	I12.9	Hypertensive renal disease without renal failure	1	0.26%
	I15.0	Renovascular hypertension	2	0.51%
	I15.1	Secondary hypertension to other renal disorders	1	0.26%
	I15.8	Other secondary hypertension	3	0.77%
	I15.9	Secondary hypertension, unspecified	17	4.35%

type of diagnosis and the profile of the department is presented in Table II.

Table III presents the information about treatment of patients in other hospitals of Silesian Province which have paediatric departments in their structure.

In 2013–2014 in the other 28 hospitals, the total number of hospitalizations in paediatric departments was 391 for 375 patients.

Similarly to clinical centres, the dominating disease entity was essential (primary) hypertension (I10).

Based on the above-mentioned facts, it can be concluded that children and teenagers with hypertension were hospitalized in specialized academic centres, mainly in paediatric cardiology and nephrology departments, while in other hospitals in paediatric departments.

The Table IV shows the number of services in cardiology and nephrology department including the type of diagnosis in age groups: up to 10 years of age, up to 11, up to 14 and up to 15 and 18 years of age.

The average time of hospitalization in cardiology department amounted to 5.2 days, nephrology 2.8 days, while in paediatric department 5.8 days.

From the reports sent to the Database of Healthcare Services of the National Healthcare Fund in Katowice (according to the current ICD-9) it can be concluded that during hospitalization in the paediatric cardiology department in all children diagnostic the following medical procedures were performed:

- anthropometric measurements;
- ECG;
- ECG monitoring;
- echocardiography;
- blood pressure monitoring;
- Holter RR blood pressure monitoring;
- USG-Doppler in particular areas;
- cardiovascular stress test (almost in 100%).

Furthermore, in over 50% of hospitalizations, ophthalmoscopy and chest X-ray were performed.

Table IV. The number of hospitalizations in 2013–2014 in clinical department of cardiology, nephrology and paediatrics divided into age and diagnosis according to ICD-10

Scope of services	Code of diagnosis	Name of diagnosis	Age up to 10	Age from 11 to 14	Age from 15 to 18
Paediatric cardiology	I10	Essential (primary) hypertension	4	24	92
	I11.9	Hypertensive heart disease without (congestive) heart failure	—	—	1
	I15.1	Secondary hypertension to other renal disorders	—	—	1
	I15.8	Other secondary hypertension	3	5	7
	I15.9	Secondary hypertension, unspecified	1	1	—
Paediatric nephrology	I10	Essential (primary) hypertension	32	62	200
	I15.0	Renovascular hypertension	1	1	3
	I15.1	Secondary hypertension to other renal disorders	9	5	9
	I15.8	Other secondary hypertension	3	—	2
	I15.9	Secondary hypertension, unspecified	2	2	2
Paediatrics	I10	Essential (primary) hypertension	—	2	5
	I15.9	Secondary hypertension, unspecified	—	—	1

Table IVA. The number of hospitalizations in 2013–2014 in paediatric departments divided into age and diagnosis according to ICD-10 in the other centres

Scope of services	Code of diagnosis	Name of diagnosis	Age up to 10	Age from 11 to 14	Age from 15 to 18
Paediatrics	I10	Essential (primary) hypertension	18	85	263
	I12.9	Hypertensive heart disease without (congestive) heart failure	—	—	1
	I15.0	Renovascular hypertension	1	—	1
	I15.1	Secondary hypertension to other renal disorders	1	—	—
	I15.8	Other secondary hypertension	—	1	2
	I15.9	Secondary hypertension, unspecified	2	2	13

In the nephrology department it was found that during hospitalization the following tests were performed repeatedly:

- anthropometric measurements;
- monitoring blood pressure;
- urinalysis;
- USG of particular abdominal areas;
- USG Doppler.

Monitoring blood pressure with Holter RR was performed in over 50%, while computed tomography only incidentally.

In paediatric departments of the other hospitals in Silesian Province, in the majority of hospitalized children ECG, monitoring blood pressure, echocardiography, abdominal and retroperitoneal ultrasonography were performed, while in 30% of children USG-Doppler in renal and urinary tract areas and USG of thyroid and parathyroids were done. The

most often performed tests within laboratory diagnostics were general urinalysis, concentration of creatinine, uric acid, lipid profile and thyroid hormones. Occasionally hospitals were reporting such services to the National Healthcare Fund System as: computed tomography, magnetic resonance, urography and angiography. The information about anthropometric measurements and monitoring with Holter was not reported.

Taking into consideration the fact that financing hospitalization by public payer, which is National Healthcare Fund, it should be emphasized that it covers the comprehensive patient care according to the current definition. The expenditure incurred on providing services results from the rate for diagnosis-related groups. In 2013–2014 they amounted totally to 2,740,255 PLN including 1,661,900 PLN in clinical centres.

Table V. The value of services performed in 2013–2014 in clinical department of cardiology, nephrology and paediatrics divided into age and diagnosis according to ICD-10

Scope of services	Code of diagnosis	Name of diagnosis	Age up to 10	Age from 11 to 14	Age from 15 to 18
Paediatric cardiology	I10	Essential (primary) hypertension	11,856 PLN	71,136 PLN	275,548 PLN
	I11.9	Hypertensive heart disease without (congestive) heart failure	—	—	2,964 PLN
	I15.1	Secondary hypertension to other renal disorders	—	—	2,964 PLN
	I15.8	Other secondary hypertension	11,752 PLN	14,820 PLN	20,748 PLN
	I15.9	Secondary hypertension, unspecified	4,212 PLN	3,900 PLN	
Paediatric nephrology	I10	Essential (primary) hypertension	78,772 PLN	166,249 PLN	507,443 PLN
	I15.0	Renovascular hypertension	2,756 PLN	2,756 PLN	11,076 PLN
	I15.1	Secondary hypertension to other renal disorders	24,799 PLN	13,754 PLN	24,751 PLN
	I15.8	Other secondary hypertension	8,268 PLN	—	5,512 PLN
	I15.9	Secondary hypertension, unspecified	3,296 PLN	5,486 PLN	5,486 PLN
Paediatrics	I10	Essential (primary) hypertension	—	5,512 PLN	13,780 PLN
	I15.9	Secondary hypertension, unspecified	—	—	2,756 PLN

Table VA. The value of services divided into age and diagnosis (according to ICD-10) performed in 2013–2014 in paediatric departments in the other hospitals

Scope of services	Code of diagnosis	Name of diagnosis	Age up to 10	Age from 11 to 14	Age from 15 to 18
Paediatrics	I10	Essential (primary) hypertension	49,861 PLN	227,284 PLN	714,208 PLN
	I12.9	Hypertensive heart disease without (congestive) heart failure	—	—	3,172 PLN
	I15.0	Renovascular hypertension	2,756 PLN	—	572 PLN
	I15.1	Secondary hypertension to other renal disorders	2,756 PLN	—	—
	I15.8	Other secondary hypertension	—	2,756 PLN	5,512 PLN
	I15.9	Secondary hypertension, unspecified	6,090 PLN	5,512 PLN	35,828 PLN

In the case of hospitalization of a child with hypertension in paediatric cardiology department, the basic accounting group was E79 (other circulatory system disorders) at a basic price equalling 2,964 PLN. However, for paediatric nephrology department the accounting group was defined as P21 (heart diseases) with a basic price for hospitalization amounting to 2,756 PLN. The difference in financing the same disease entities between hospital departments amounted to 208 PLN.

In the other hospitals in paediatric departments in the corresponding period financing hospitalization amounted to 1,078,355 PLN, which represents 39.35% of the total amount devoted to patient hospitalization with hypertension in the age group from 0–18 years of life, while the most frequently declared diagnosis-related group was, similarly to paediatric nephrology, the group P21 (heart diseases).

Total expenditure incurred by National Healthcare Fund on hypertension treatment according to ICD-10 diagnoses in relation to the age group of patients was calculated after recounting the unit value of hospitalization in the entity in question by the number of provided services, which is presented in Table V.

Due to the lack of generally applicable detailed assessment of medical procedures, it is difficult to refer to the cost of hypertension diagnostics in children in a detailed analysis. In many well-known units detailed costs of different tests have been developed, but they are treated as confidential data and are not generally available. However, the prices of commercial services are available on the Internet.

Table VI presents exemplary prices of commercial procedures performed in medicinal units in relation to three stages of diagnostics.

Table VI. Commercial prices of procedures at different stages of hypertension diagnostics

3 stages of diagnostic procedure Type of test	John Paul II Upper Silesian Child Health Centre	University Children's Hospital of Cracow	Independent Public Children's Clinical Hospital in Warsaw	University of Bialystok Children's Clinical Hospital
STAGE I				
Collecting material	3.69 PLN	—	11.00 PLN	10.00 PLN
CBC	9.84 PLN	12.00 PLN	12.00 PLN	11.00 PLN
Creatinine	6.77 PLN	6.00 PLN	12.00 PLN	5.50 PLN
Sodium	6.77 PLN	6.00 PLN	10.00 PLN	6.00 PLN
Potassium	6.77 PLN	6.00 PLN	10.00 PLN	6.00 PLN
Chloride	6.77 PLN	6.00 PLN	14.00 PLN	5.50 PLN
Calcium	6.77 PLN	6.00 PLN	10.00 PLN	6.00 PLN
Bicarbonates	18,45 PLN	—	14,00 PLN	—
Total cholesterol	6.77 PLN	6.00 PLN	12.00 PLN	6.00 PLN
HDL fraction	12.30 PLN	8.00 PLN	12.00 PLN	7.50 PLN
LDL fraction	12.30 PLN	10.00 PLN	29.00 PLN	17.00 PLN
Triglycerides	13.53 PLN	7.00 PLN	12.00 PLN	6.00 PLN
Uric acid	7.38 PLN	6.00 PLN	12.00 PLN	6.00 PLN
Glucose	6.77 PLN	6.00 PLN	12.00 PLN	5.50 PLN
Urinalysis	9.23 PLN	4.00 PLN	18.00 PLN	7.50 PLN
24 hour albuminuria or index	43.05 PLN	22.00 PLN	28.00 PLN	—
Albumin/creatinine in urine	12.30 PLN	6.00 PLN	28.00 PLN	10.50 PLN
Ophthalmoscopy	—	100.00 PLN	—	—
Kidney and renal arteries USG-Doppler	—	—	180.00 PLN	110.00 PLN
Left ventricular mass and aortic arch echocardiographic assessment	—	—	130.00 PLN	—
IMT assessment	100.00 PLN	—	120.00 PLN	—
Cranial Ultrasonic Scans in newborns	—	100.00 PLN	100.00 PLN	—
ABPM in children > 5 years of life HOLTER	—	—	120.00 PLN	—
STAGE II				
Glycaemia, oral glucose tolerance test, insulinaemia in patients with BMI > 85. cc	6.77 PLN	—	—	—
Catecholamine release assessment in younger children and all patients with 2 degree hypertension	—	160.00 PLN	—	—
Serum renin activity/renin and aldosterone concentration in younger children and all patients with 2 degree hypertension	—	45.00 PLN	—	—
Urine steroid profile or 17 keto- and hydroxysteroid assay in younger children and all patients with 2 degree hypertension	—	50.00 PLN	—	—
TSH	24.60 PLN	23.00 PLN	18.00 PLN	13.50 PLN
FT3	24.60 PLN	23.00 PLN	18.00 PLN	15.00 PLN
FT4	24.60 PLN	23.00 PLN	18.00 PLN	14.50 PLN
Vitamin D3 metabolites	—	100.00 PLN	48.00 PLN	43.50 PLN
Renal scintigraphy (captopril test) in younger children and all patients with 2 degree hypertension	—	560.00 PLN	—	—
STAGE III				
Non-invasive and invasive medical imaging of renal arteries	—	—	—	—
Angio-CT	550.00 PLN	500.00 PLN	—	460.00 PLN
Angio-MR	—	—	—	500.00 PLN
Classic arteriography	—	—	—	—
Medical imaging of adrenal and paraganglioma pathology	—	—	—	—
Non-invasive vascular angiography of other vascular areas (ce- liac artery, intracranial arteries)	—	—	Doppler 180.00 PLN	—
Molecular test	—	407.00– –1,200.00 PLN*	Cytogenetic 570.00 PLN	—

*typical molecular test

Source: Websites of the above-mentioned hospitals

Discussion

There are few reports about calculation of costs linked to hypertension in Poland and almost all of them concern adults or young adults. Reports referring to Polish population of the developmental age are rare [8].

The diagnostic process is multi-stage and should take into consideration the exclusion of secondary causes of hypertension. The Polish Society of Hypertension in the 2015 guidelines for the management of hypertension specifies in detail the stages of diagnostics and different procedures assigned to them [3]. According to experts, echocardiography and microalbuminuria test should be performed in every child with hypertension [9]. In this area, the role of General Practitioner is limited by the list of guaranteed services in primary healthcare units. The doctor may order a general urinalysis, but in the case of echocardiography he/she must refer a patient to a cardiology clinic. If organ changes are found, it is advisable to intensify the diagnostic and therapeutic process.

As it results from National Healthcare Fund report published in 2010, 14% of the whole refund budget was used on the pharmacotherapy of cardiovascular disorders. The calculation of indirect and direct costs may provide information about the financial effects linked to hypertension treatment. In the Polish subject literature, this information is available but concerns only the population of adults. In 2011 the total cost of diagnostics and treatment of hypertension in hospitals amounted to 3,303.42 PLN. The analysis concerned 110 patients at the age of > 50, but the calculations did not take into account salaries of personnel and depreciation of equipment. The total expenditure connected with hospitalization was mainly generated by disorders accompanying hypertension often occurring at this age. In overall costs of diagnostics, the cost of test for patients with isolated hypertension equalled 1%. It was assessed that the functioning costs of the department constituted about 30% of indirect medical costs [11]. In the other study (PENT) the authors conducted a calculation for patients over 18 years participating in the epidemiological program assessing the frequency of hypertension in Poland and found that the direct costs constituted 10.3 billion PLN, while indirect costs amounted to about 2.7 billion (73.6% and 26.4% respectively). Direct costs included: medical advice which constituted 31%, hospitalization — 21%, specialist and diagnostic tests — 11% and expenditures on medicine — 10% [12]. In DETENT study performed in 2008 it was

found that cardiologists more often apply new generation of medicines rather than the primary care doctors [13].

On the basis of the analysis of the material concerning diagnostics and treatment of children with hypertension in the Silesian Province, it may be concluded that the biggest financial burden for National Healthcare Fund was constituted by services linked to patients' hospitalization. The most numerous group consisted of patients at the age between 15 and 18 years who were eventually diagnosed with essential (primary) hypertension (I10). This trend persists despite the differences resulting from the profile of specialization.

Taking into consideration the aim of the study and applied methodology, this study cannot be interpreted in the category of an epidemiological study. The obtained results in the area of hypertension in children and teenagers rather indicate the need of conducting an epidemiological study and related advanced economic analyses. There are a few reasons that determine the limitations in interpretation of the results. In the present reporting system concerning financing of services by National Healthcare Fund, detailed determination of the structures of health problems in primary healthcare unit is not possible because such data are not registered. To a certain limited extent some data may be gained from MZ-11 reports conveyed to the Centre of Health Information System. The authors of the report used this source to determine the number of children and teenagers with hypertension covered by active care of primary care unit doctors. The obligation of conveying statistical data is due to the regulation about public statistics, while the responsibility for preparing a correct report lies with the Head of the unit [14]. The basis for filling in the form is medical documentation which must be maintained by all healthcare units. Under the current regulations, by diagnosing hypertension in a child the doctor (after 3 subsequent visits during which he/she finds the value of blood pressure equal or over 95 percentile for gender, age and height) should commence diagnostics in order to determine the type of hypertension. However, during every visit, according to the Regulation of Minister of Health the doctor is obliged to make a diagnosis even if the patient is still under observation [15]. Another question concerning properly registered (and reported) diagnoses appears at the moment of choosing the code according to the commonly used system ICD-10, when the doctor may choose one of the types of hypertension from I10 do I15. At an early stage of diagnostics, the solution would be to choose R03 code (elevated blood pressure without

hypertension). The category should be applied to indicate an elevated blood pressure in the patients, who cannot be diagnosed with hypertension due to the lack of basis, or a one-time casual blood pressure measurement during the initial observation of the patient. As it results from controls of medical documents, such actions were not common.

In the analysed material, the differences in the range of applied diagnostic procedures between departments of clinical centres and other paediatric departments were noted. The diagnostic process of hypertension in children and teenagers conducted in cardiology departments was most compatible with the current guidelines of Polish Society of Hypertension.

Conclusions

According to prognoses, in the nearest future 588 million more people are expected to be diagnosed with hypertension, while the total number of patients in the world will amount to 1.56 billion [16]. It may be assumed that the number of ill individuals in Poland will also increase and therefore the expenditure on treatment will grow as well. The prognosis concerning the population of developmental age are not known. The analysis of financing services linked to hypertension may provide much valuable information also in the area of medical policy and public health design. The detailed assessment of diagnostic and therapeutic procedures applied in children with hypertension as well as clarification of qualification rules of diagnoses according to the system ICD-10 would increase the value of the source material possessed by National Healthcare Fund. Development and dissemination of code systems (QR codes, Tags, RFID) and reading (scanners/code and tags readers) during performing the procedures in diagnostic and medicinal units would significantly facilitate documenting them (the type, number etc.) as well as relieve the medical personnel. From the perspective of disease management it seems that it would also be easier to take administrative decision concerning centralization and decentralization of diagnostic and medicinal centres for children with hypertension.

Joint studies and analyses by teams consisting of clinicians, epidemiologists and National Healthcare Fund workers including economists and lawyers would enable to present the problem of hypertension in children from a different perspective, which would consequently lead to introduction of beneficial changes in the field of prevention, improvement of diagnostic and therapeutic organizational process and the efficacy of service financing.

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