Awareness of Risk Factor Management, Complications, and Prevention Among Adult Patients With Recently Diagnosed Hypertension

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Key Words: *patient awareness, hypertension, hypertension risk factors, blood pressure management, hypertension complications.*

Summary. *Hypertension is the main risk factor for cardiovascular and renal diseases. Awareness of hypertension has been researched for extended time. It is a serious concern of public health worldwide. A common problem regarding hypertensive patients in Estonia is a lack of or inadequate management of elevated blood pressure.*

The aim of this descriptive quantitative research study was to explore awareness of blood pressure, hypertension risk factors, hypertension management and complications among the patients with the diagnosis of essential hypertension during 2012 in Estonia.

Methods. A random sample (n=2700) involved 30% of the population. The subjects were delivered a questionnaire by direct mailing by the Health Insurance Fund. The final sample comprised 857 subjects. Background variables involved gender, age, residence, education, occupational status, and the primary communication language.

Results. Stress (51.7%), overweight (47.0%), and alcohol abuse (37.1%) were mentioned as very important causes for increased blood pressure. The majority of the respondents (70.0%) considered increased blood pressure very dangerous. Besides, 70.8% of the respondents reported a strong relationship between elevated blood pressure and stroke. For 79.5% of the respondents, it was most important to follow the treatment prescribed by a physician. The role of weight loss (60.1%) and healthy diet (58.6%) were highly estimated. Less than half of the respondents (40.4%) interrupted their medication; and the highest interruption rate was observed (50.5%) in the youngest age group (18 to 39 years). The occupationally active respondents interrupted their medication more frequently (45.6%) compared with the occupationally inactive subjects (34.4%). Regular use of prescribed medicines, stopping smoking, and decrease of workload were reported as the most important factors that helped to keep blood pressure under control. The role of physical activity, healthy diet, decreased salt consumption, and stress avoidance were also reported as important factors.

Introduction

The most common risk factor of cardiovascular diseases and impairment of kidneys is arterial hypertension. In order to control arterial hypertension, various pharmacological and nonpharmacological methods are used (1–3). A common problem regarding hypertensive patients in the world as well as in Estonia is inadequate management of elevated blood pressure that is often caused by low awareness of lifestyle changes (stress, diet, overweight, insufficient physical activity, alcohol consumption, and cigarette smoking) that reduce blood pressure (4–7) and improper adherence or non-adherence to the therapeutic regimen (8–13).

The most common risk factors of hypertension are considered to be stress, incorrect nutrition, elevated body mass index, limited physical activity, harmful habits, heredity, and age (4, 5, 7, 14, 15).

Gascón et al. (8) have concluded in their study that control of hypertension is dependent on the patient, his or her knowledge, and attitudes toward medication (9–13), lifestyle (16–18) and disease awareness (2, 14, 19–21), especially risk factors (22, 23), and possible late complications (11, 24, 25).

Taylor and Ward (26) in their study have concluded that patients were aware of stroke and cardiac infarction as complications of hypertension. Oliveria et al. (19) have found that 91% of patients reported that they were told their blood pressure value by health care workers, but 41% of them could not remember their blood pressure values. Various studies have shown that patients are not informed of the values of their own blood pressure and the values of heightened blood pressure (2, 21, 27). Based on research results, researchers claim that about 60%–73% of patients adhere to their treatment (2,

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26). A considerable number of patients fail to take their prescribed medications. Patients often forget to take their medications (10, 11), cannot buy prescribed medications due to the lack of money or they claim to feel well enough without taking their medications (9, 10, 12, 13).

Patient awareness can be influenced by sociodemographic variables. Various researchers (15, 19, 21) have concluded that patients with secondary and higher education have better awareness about hypertension compared with patients with lower education. Viera et al. (21) also concluded that older patients had lower awareness compared with other patients. Some studies have not found associations with other sociodemographic variables (19, 21).

The aim of this study was to explore awareness of blood pressure, hypertension risk factors, hypertension management, and potential complications among the patients with the diagnosis of essential hypertension during 2012 in Estonia; and to determine the associations between age, level of education, professional status, residence, gender, communication language, and awareness.

Material and methods

Study sample. The population of the study comprised all adult (18 years and older) patients receiving the diagnosis of essential hypertension (ICD 10) within the period of January 1, 2012, to December 31, 2012. All members of the population visited a general practitioner or a specialist, and the diagnosis of hypertension was noted on the invoices of service providers (N=9482). The random sample involved 30% of the population; sampling was done by the Health Insurance Fund. The sample is representative of the population. In total, 2700 questionnaires were mailed to the subjects by the Health Insurance Fund. The patients had 45 days to fill out the questionnaire, and no additional attempts were made to increase the response rate due to the lack of financial resources. Filled questionnaires were sent directly to the researchers. The questionnaire was filled out by 861 patients; of them, 4 respondents were not adults and were not included in the analysis. The final sample consisted of 857 respondents; the response rate was 31.7%.

The respondents were divided into 4 age groups (18–39, 40–59, 60–79, and 80+ years), into 3 groups based on their education (basic, secondary, and higher), into urban and rural (small towns and villages) residents based on their places of residence, into active (working or looking for work) and inactive respondents (retired, at home, and not looking for work) based on their occupational status, and their primary communication language (Estonian or Russian). The distribution of the respondents according to sociodemographic background variables is presented in Table 1.

Table 1. Sociodemographic characteristics of study population

Background Variable	No. of Persons	%
Gender		
Men	312	36.6
Women	541	63.4
Age		
18–39	118	8.2
40–59	497	58.4
60–79	236	43.3
80+	49	5.8
Education		
Basic	118	13.9
Secondary	497	58.4
Higher	236	27.7
Place of residency		
Urban	588	69.3
Rural	261	30.7
Occupational status		
Active	450	52.9
Not active	400	47.1
Primary communication language		
Estonian	582	69.0
Russian	262	31.0

Questionnaire. The questionnaire was composed by the authors of the study and based on the research done by Oliveria, Taylor and Ward, Gascon and Yasein (4, 8, 19, 26). The questionnaire consisted of 100 items. The questionnaire consisted of 3 parts: background information (sex, age, education, occupational status, communication language, place of residence; 6 items), questions about awareness of hypertension (70 items), and awareness and attitudes about patient's own hypertension (24 items). The respondents assessed their awareness on the 5-point Likert scale using the following answers: very important, important, somewhat important, not so important, and not at all important. Age was defined as a number of lived years. All the respondents reported their sex (man, woman), first communication language (Estonian, Russian), education (elementary, basic, secondary, higher education), occupational status (working, studying, staying at home, retired, unemployed), and place of residence (town, small town, rural).

The questionnaire was assessed by 2 professors of family medicine at the University of Tartu. The questionnaire was anonymous and voluntary.

The questionnaire was piloted in May through June 2013 by 2 general practitioners. First, 40 questionnaires were given to patients receiving the diagnosis of essential hypertension and 20 responses

were collected. Minor changes in wording of the questions were made. The questionnaire was translated into Russian using back and forth translation by 2 approved translators who had medical background. The main questionnaire was delivered and the survey took place in October 2013.

All the patients could fill out the questionnaire either in Estonian or in Russian, in their primary communication language. The number of Estonian respondents was 582 (69.0% of all the received questionnaires) and the number of Russian respondents was 261 (31.0% of all the received questionnaires).

Statistical analysis. The data were analyzed on SPSS version 16.0. The distributions of the items were presented in percentage. The associations between background items and awareness were tested using the chi-square and the Kruskal-Wallis test (K). For nonparametric-unpaired data with more than 2 groups, the Kruskal-Wallis test was used to assess differences in awareness. The Kruskal-Wallis test was used in similar studies of awareness (29). The associations between awareness scores and background variables were also tested using the Kruskal-Wallis test. Statistically significant associations were detected on the basis of $P<0.05$.

Ethical considerations. The study was approved by the Research Ethics Committee of the University of Tartu in 2013, protocol 224/T-15.

Results

Risk factors for elevated blood pressure. Stress (51.7%), overweight (47.0%), and alcohol abuse (37.1%) were mentioned as very important causes for increased blood pressure. Increased cholesterol levels, heredity, overconsumption of salt, and age were also mentioned among the risk factors (Fig. 1).

Relevance and values of blood pressure and harm for health. The majority of the respondents (70.0%) considered increased blood pressure very dangerous and 30.0% of the respondents somewhat dangerous. Besides, a large number of the respondents (77.1%) reported that reduction of blood pressure "would considerably improve health." Elevated blood pressure as a very urgent problem was reported by 70.8% of the respondents, and somewhat urgent by 24.9% of the respondents. Administration of medicines for keeping blood pressure under control was considered very important by 82.6% of the respondents and somewhat important by 12.3% of the subjects.

Estimates of harmfulness related to elevated blood pressure were statistically associated with gender (Table 2). Compared with the men, the women provided higher estimates of high blood pressure dangers, the need for blood pressure reduction, relevance of the problem, and maintaining blood pressure under control. The associations with the occupational status and age were also statistically

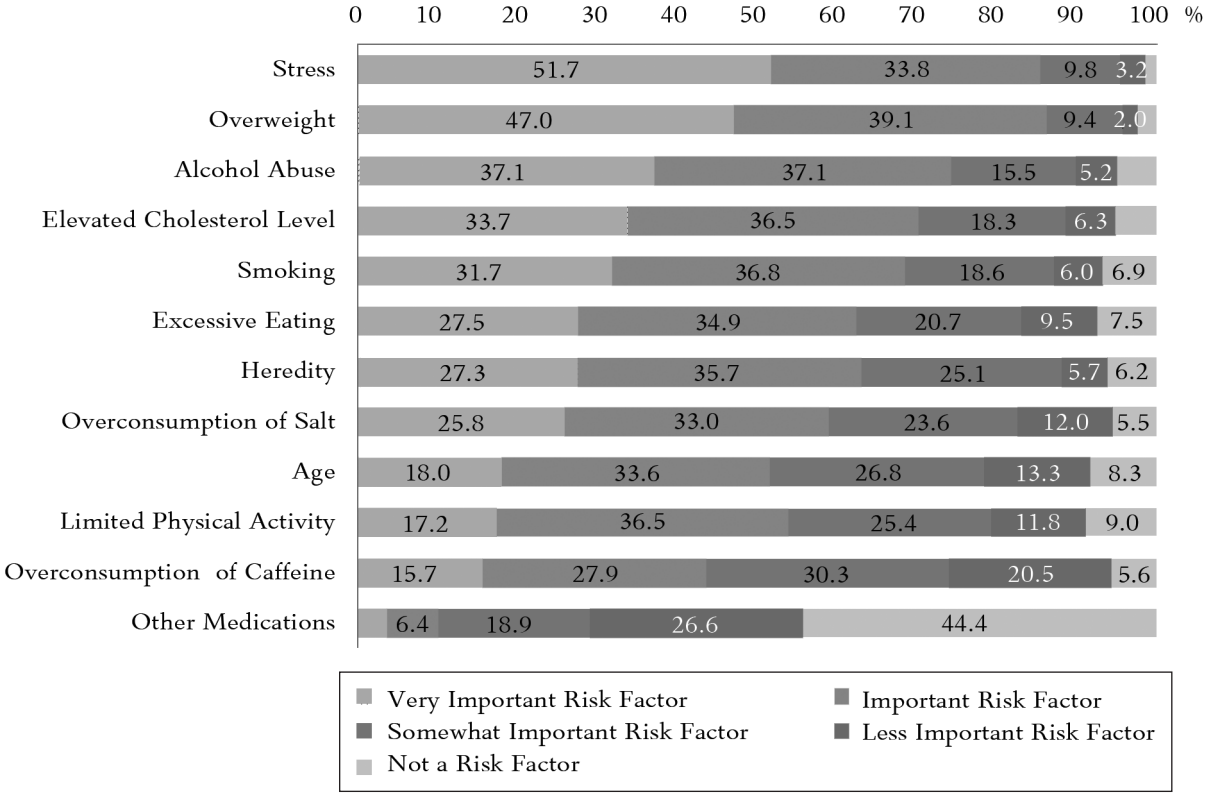

Fig. 1. Awareness and risk factors of elevated blood pressure

Statistically significant associations with the background variables were not found.

significant; the highest estimate of high blood pressure dangers was provided by the respondents in the age group from 40 to 59 years.

Awareness of blood pressure values. Up to 92% of the respondents knew the correct limits of systolic and diastolic blood pressure. The proportion of the respondents unaware of the limits of blood pressure was the biggest in the age group from 18 to 39 years (7.2%). The majority of the respondents (84.6%) were aware that it was important to lower systolic as well as diastolic blood pressure. On the other hand, 13.0% of the respondents in the age group from 18 to 39 years could not tell which blood pressure was more important to reduce.

In addition, 90.8% of the respondents remembered the value of their blood pressure measured during their last visit to the physician's office. However, 15.9% of the respondents in the age group from 18 to 39 years could not remember the value of their blood pressure during their last visit to the physician's office, or whether they were told the values of their blood pressure.

Statistically significant associations were identified between awareness of blood pressure and the place of residence, occupational status, and education (Table 3). The respondents living in urban settings, occupationally active or with higher education were more aware of the values of blood pressure limits. Awareness of their own blood pressure was associated with the place of residence, occupational status, and education.

Awareness of activities for blood pressure reduction. A greater part of the respondents (79.5%) noted the adherence to the prescribed medical regimen as the most important measure. The roles of weight loss and a healthy diet were also provided high estimates, 60.1% and 58.6%, respectively. The other activities that were considered relevant in the reduction of blood pressure included quitting cigarette smoking (57.6%), reduction of excessive alcohol consumption (53.2%), increasing physical activity (41.7%), and reduction of salt consumption (41.0%).

Respondent awareness of the activities regarding blood pressure reduction had statistically significant associations with gender, the language of communication, educational level, and place of residence (Table 4). Awareness of the activities regarding blood pressure reduction was higher among the Estonian speaking female respondents and the respondents with a lower educational level and living rural areas.

Awareness of complications. The respondents noted the following complications of high blood pressure: stroke (24.9%), cerebral infarction (21.1%), and cardiac infarction (17.9%). Statistically significant associations were found between the awareness of complications and educational level as well as the language of communication (Table 5). A higher

Table 2. Associations Between Background Variables and Score of Awareness About Relevance and Values of Blood Pressure and Harm for Health (*P* values)

Background Variable	Kruskal-Wallis Test
Gender	0.831
Age	0.815
Education	0.950
Place of residence	0.852
Occupational status	0.508
Primary language	0.173

Table 3. Associations Between Background Variables and Score of Awareness of Blood Pressure Values (*P* values)

Background Variable	Kruskal-Wallis Test (K)
Gender	0.947
Age	0.122
Education	0.202
Place of residence	**0.007**
Occupational status	**0.002**
Primary language	**0.015**

P values written in Bold are significant.

Table 4. Associations Between Background Variables and Score of Awareness of Activities for Blood Pressure Reduction (*P* values)

Background Variable	Kruskal-Wallis Test (K)
Gender	**0.010**
Age	0.101
Education	**0.007**
Place of residence	0.038
Occupational status	0.150
Primary language	**0.000**

P values written in Bold are significant.

Table 5. Associations Between Background Variables and Score of Awareness of Complications (*P* values)

Background Variable	Kruskal-Wallis Test (K)
Gender	0.305
Age	0.794
Education	0.119
Place of residence	0.282
Occupational status	0.836
Primary language	**0.049**

P values written in Bold are significant.

educational level was associated with higher awareness.

Medication interruption and causes for medication interruption. Less than half of the respondents (40.4%) interrupted their medication; the highest interruption rate (50.5%) was observed in the youngest age group (18 to 39 years). The occupationally active respondents interrupted their medication more frequently (45.6%) compared with the occupationally inactive subjects (34.4%); the Estonian speaking respondents interrupted their medication less frequently (37.7%) compared with the Russian speaking respondents (46.3%).

The causes for medication interruption included forgetfulness (32.0%), occurrence of unpleasant side-effects (24.3%), and forgetting to request a repeat prescription (19.3%) (Fig. 2).

The number of the respondents who interrupted their medication was greater among the female subjects compared with their male counterparts, 11.5% and 7.7%, respectively. The medication interruption among the female respondents was caused by a potential harm of medication to the body and numerous side-effects listed in the package leaflet (15.2% of the women) (Table 6). The medication interruption caused by a lack of money was most common among the respondents with primary and basic education and the least common among the respondents with higher education (4.9%). The occupationally inactive respondents interrupted their medication most frequently for the reason of numerous side-effects listed in the package leaflet (18.9%).

Awareness of factors that keep blood pressure under control. Regular use of prescribed medicines (60.5%), physical activity (37.8%), stopping smoking (37.8%), and reduction of workload (36.5%) were reported as the most important factors that helped to keep blood pressure under control. The role of physical activity, a healthy diet, decreased salt consumption, and stress avoidance were also reported among important factors (Fig. 3).

The factor of keeping blood pressure under control had statistically significant associations with gender, occupational status, age, and educational level (Table 7). Awareness of the factors that keep blood pressure under control was higher among the female respondents; and it was increasing with age. Awareness was higher among the respondents who were occupationally inactive and whose educational level was lower.

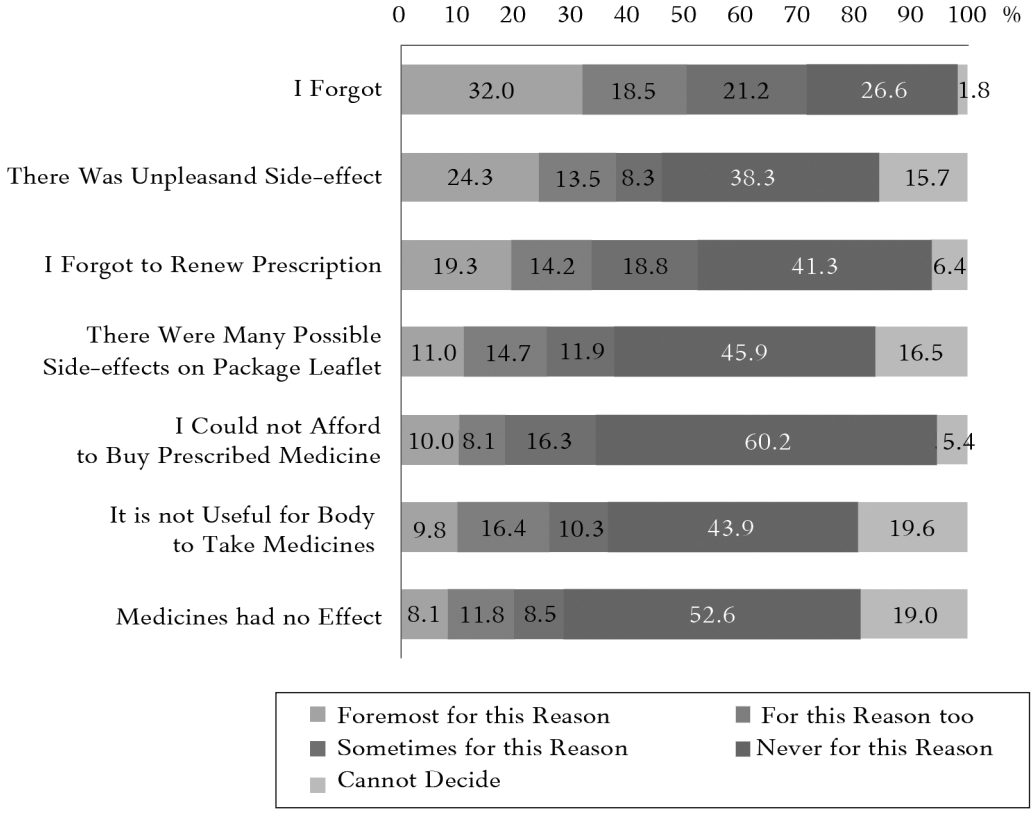

Fig. 2. Causes for medication interruption

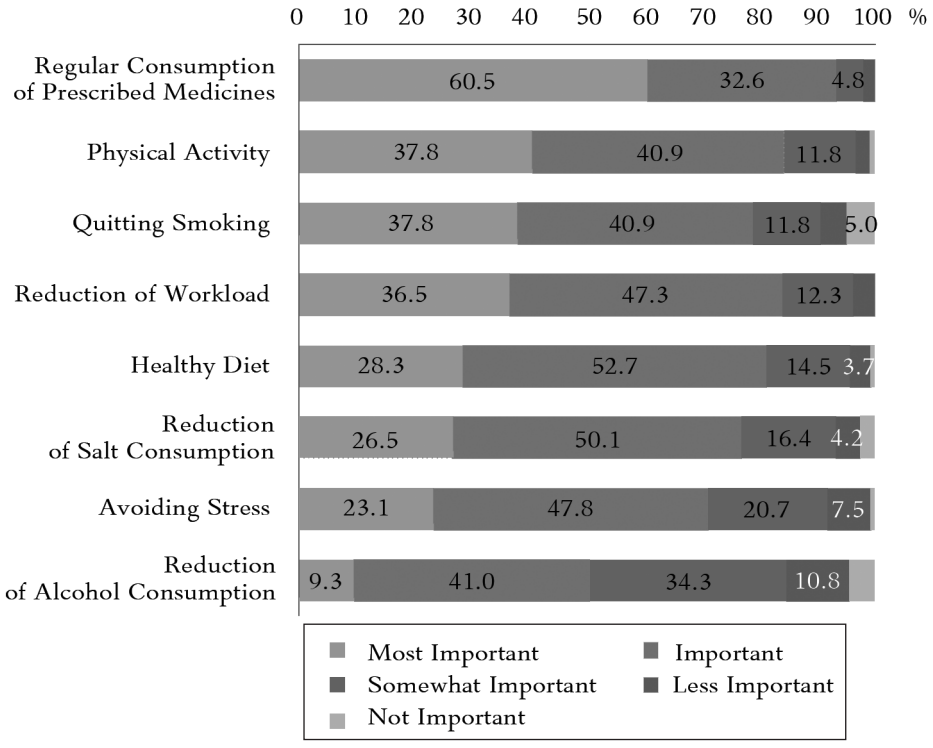

Fig. 3. Awareness of the factors that keep blood pressure under control

Table 6. Associations Between Background Variables and Causes of Medication Interruption (*P* Values of Kruskal-Wallis Test)

Cause of Medication Interruption	Gender	Age	Education	Place of Residence	Occupational Status	Primary Language
I forgot to renew prescription	0.054	0.878	0.464	0.230	0.441	0.623
There was unpleasant side-effect	0.053	0.713	0.160	0.965	0.345	0.079
I forgot	0.599	0.745	0.649	0.199	0.814	**0.035**
I could not afford to buy prescribed medicine	0.877	0.261	**0.010**	0.636	0.406	0.172
Medicines had no effect	0.499	0.954	0.255	0.965	0.638	0.645
It is not useful for body to take medicines	0.045	0.423	0.348	0.211	0.078	0.605
There were many possible side-effects on package leaflet	**0.012**	0.314	0.665	0.109	**0.016**	0.547

P values written in Bold are significant.

Table 7. Associations Between Background Variables and Factors of Controlling Blood Pressure (*P* Values)

Background Variable	Kruskal-Wallis Test (K)
Gender	**0.001**
Age	0.121
Education	**0.041**
Place of residence	0.626
Occupational status	**0.001**
Primary language	0.570

P values written in Bold are significant.

Discussion

The results of the study provide an overview of patient awareness regarding hypertension, hypertension risk factors, potential complications, factors reducing blood pressure, and hypertension management. The participants in the study reported stress as a very important risk factor for blood pressure elevation. This outcome corresponds to the results demonstrated in a number of publications (5–7). Overweight related to incorrect nutrition (4–7, 14, 15) was also reported among the causes, in addition to overconsumption of alcohol, age, heredity,

elevated cholesterol levels, and overconsumption of salt. These outcomes correspond to the research results published across the world (4–7).

Research results in other countries show that many patients are not aware of their own values of blood pressure and the limits of normal blood pressure (2, 21, 27). According to the results of this study, more than 90% of the respondents were aware of the limits of blood pressure values and their own blood pressure values measured during their last visit to the physician's office. This is considered a satisfactory result and it may be presumed that informing patients of their blood pressure values is a common practice in the Estonian health care system or patients have easy access to different patient education materials. The highest proportion of the patients not aware of their own blood pressure values was observed among younger respondents who probably had no severe symptoms and chose not to remember the readings they could not relate to their health and wellbeing. Awareness of blood pressure values was lower among the rural respondents and the subjects with elementary or basic education.

Dangers accompanied by elevated blood pressure were estimated the highest by the female subjects and also by the older working-age respondents (the age group from 40 to 59 years). The women cared more about their health. That can be explained by higher health awareness and life experience, but also by the impact of hypertension on coping with occupational responsibilities. For most of the respondents, it was most important to follow the treatment prescribed by a physician to reduce blood pressure, and all the other activities related to lifestyle were also considered important (diet, reduction of alcohol consumption, stopping cigarette smoking, weight loss, etc.). Awareness of activities for blood pressure reduction was higher among the female respondents and among the respondents with a lower educational level. In the current study, the respondents with a higher level of education and male respondents were more skeptical about the importance of adherence to the prescribed therapeutic regimen and lifestyle activities in keeping blood pressure under control. The respondents had very good knowledge of the activities meant for blood pressure reduction. Awareness of blood pressure reduction was associated with age and education. Older patients and those with lower education were more aware of blood pressure reduction compared with younger and higher educated patients. That is contrary to the research results obtained by Oliveria et al. (19) and Viera (21), where respondents with higher education had better knowledge compared with subjects with a lower educational level. One may assume that higher awareness among lower educated and older patients may result from more extensive life and disease experience. The impact of health behavior on keeping blood pressure under control should be facilitated by more frequent explanations by health care professionals and support for lifestyle changes that focus on health.

A number of the patients who participated in this study were aware of late complications of hypertension. The results of the study by Oliveria et al. (19) have demonstrated that subjects connected hypertension with cardiac and renal failure; Taylor and Ward (26) have demonstrated that the majority of patients were aware of the risks of stroke and heart infarction. The respondents of this study also connected elevated blood pressure with stroke, cerebral and cardiac infarction. A strong association between stroke and elevated blood pressure might have been influenced by the fact that a number of stroke cases and related health problems that occurred among public figures in the country were revealed in the mass media prior to and during this research study.

A common problem is irregular administration of blood pressure medication that is also demonstrated by a number of studies carried out in the world (8–13). The number of the respondents who interrupted their medication (40%) was also high in this study. The interruption rate was higher in the youngest age group and also among the occupationally active respondents. Forgetfulness was reported as the main reason for medication interruption; similar results have been demonstrated in earlier studies (10, 11). Nurses and doctors should teach and counsel patients about the implementation of different medication reminders (smartphone reminders, reminder stickers in the home environment, etc.) to facilitate regular medication or request for a repeat prescription.

An unpleasant side-effect was reported as one of the causes for medication interruption. This has not been found in previous studies researched by the authors in preparation of the current study. In fact, 18% of the respondents interrupted their medication for a lack of money, which corresponds to earlier research results (10, 12, 13). Some of the respondents had a misconception that drugs did not help or medication was not beneficial for the body. This kind of misconception should alert health care professionals to pay more attention to teaching patients about the use of blood pressure medication, including understanding their perceptions, and also explaining the importance of regular medication. More effort should be made to increase patient awareness of the effect of medication in keeping the disease under control; patient teaching and counselling should be improved.

Regular use of prescribed medication was reported as the most important factor that helped to keep blood pressure under control. The respondents were also aware of other factors, but they were not considered very important. The more common non-pharmaceutical factors used for keeping blood pressure under control involved physical activity, stopping cigarette smoking, and a healthy diet. Stress avoidance was provided a bit lower estimates by the respondents. That is a surprising result keeping in mind the fact that stress was reported as the main factor that elevated blood pressure. Reduction of alcohol consumption was considered necessary, but it was not reported as very important. Awareness was higher among the female respondents and among the subjects with a lower educational level. The results of this study fail to confirm the essential impact of education on patient awareness, since in some instances the subjects with lower educational levels and older respondents demonstrated higher levels of awareness. The primary communication language was important for the authors and for the Health Insurance Fund in order to assess the needs for educational materials in Estonian and Russian for patients.

This study has some limitations. Validation of the questionnaire was not among the purposes of the current study. The authors followed the examples of previous studies in composing the questionnaire (4, 19, 26). The questionnaire was assessed and reviewed by experts in family medicine and it was piloted. Minor changes in wording of the questions were done after a pilot study. The study describes awareness of hypertension among Estonian patients. More than 30% of the questionnaires were returned. The response rate was influenced by the anonymity of responses, and it was not possible to resend the questionnaire. Generalizing conclusions of the current study to the whole population can be limited, but the conclusions apply for the sample. The conclusions of the current study enable description of awareness and increase awareness of patients with different activities. In order to increase reliability of the results, the authors used 2 statistical methods (Kruskal-Wallis and Pearson chi-square).

This study highlights certain aspects of hypertension knowledge that need to be improved. For example, patient education materials can be updated and more attention can be paid in the process of patient education by nurses in health-care practice.

Statement of Conflict of Interest
The authors state no conflict of interest.

Pacientų, kuriems neseniai diagnozuota hipertenzija, suvokimas apie ligos rizikos veiksnių valdymą, komplikacijas ir profilaktiką

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Raktažodžiai: pacientų suvokimas, hipertenzija, rizikos veiksnių valdymas, kraujospūdžio reguliavimas, hipertenzijos komplikacijos.

Santrauka. Šio kiekybinio aprašomojo tyrimo tikslas – ištirti pacientų, kuriems 2012 m. Estijoje diagnozuota hipertenzija, suvokimą apie kraujospūdį, hipertenzijos rizikos veiksnius, ligos valdymą ir komplikacijas.

Metodai. Atsitiktinė tiriamųjų atranka (N=2700) apėmė 30 proc. visos populiacijos. Tyrimo imtis – 857 tiriamieji. Anketas tiriamiesiems Valstybinė ligonių kasa išsiuntė paštu. Buvo renkami ir socialiniai demografiniai duomenys apie tiriamuosius: lytis, amžius, gyvenamoji vieta, išsimokslinimas, profesija ir pagrindinė tiriamojo kalba.

Rezultatai. Stresas, antsvoris ir alkoholinių gėrimų vartojimas, respondentų požiūriu, buvo itin svarbūs veiksniai, didinantys kraujospūdį. 70 proc. tiriamųjų manė, kad kraujospūdžio padidėjimas yra grėsminga sveikatai būklė; 70,8 proc. padidėjusį kraujospūdį siejo su insultu; 79,5 proc. tiriamųjų manė, kad svarbu laikytis gydytojo nurodymų. Svorio mažinimas ir sveika mityba, tiriamųjų požiūriu, yra labai svarbūs. Vaistų vartojimą kada nors buvo nutraukę 40,4 proc. pacientų. Svarbiausi veiksniai, reguliuojantys kraujospūdį, tiriamųjų manymu, yra: reguliarus vaistų vartojimas, nerūkymas ir darbo krūvio mažinimas.

Išvados. Atsižvelgiant į tyrimo rezultatus, mokomoji medžiaga pacientams turėtų būti atnaujinta skiriant didesnį dėmesį sveikatos priežiūros praktikoje vykdomam pacientų mokymui, prie kurio daugiau prisidėtų slaugytojai.

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