UDC 16.12-008.331.1-02-07-053.8
DOI: 10.14739/2310-1210.2021.1.224876

The influence of medical and social risk factors on the development of hypertension in the adult population at the regional level

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A – research concept and design; B – collection and/or assembly of data; C – data analysis and interpretation; D – writing the article; E – critical revision of the article; F – final approval of the article

Key words: hypertension, risk factors, primary prevention.

Zaporozhye medical journal 2021; 23 (1), 42-45

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The aim of the study was to investigate the impact of medical and social risk factors (RF) on the development of arterial hypertension (AH) in the adult population at the regional level (Zaporizhzhia, Ukraine).

Materials and methods. The study, after obtaining an informed consent, involved 2000 patients, residents of Zaporizhzhia region, including 1000 patients (522 men and 478 women, mean age 51.60 ± 0.85 years) with AH and 1000 patients (478 men and 522 women, mean age 49.80 ± 0.94 years) without AH. The relationship between hypertension and the action of already known RF, the reliable connection of which has been proven by many studies, including burdened heredity, overweight, excessive alcohol consumption, smoking, physical inactivity, and some social and economic RF. In order to achieve the goal of the study, we used a set of general scientific and special interrelated and consistently applied methods: system analysis, bibliosemantic, descriptive statistics, calculating the odds ratio (OR) of the event with a 95 % confidence interval (CI); values of P to define statistical significance.

Results. According to our study, the simple logistic regression analysis of persons from the study cohort reveals a reliable relationship ($P < 0.05$) between AH and family history of hypertension, overweight, physical inactivity, smoking. Along with the well-known RF, the residents of the Zaporizhzhia region are exposed to other social and economic RF, in particular, poor living standards (OR 2.45; 95 % CI 2.04–2.94; $P < 0.0001$), unemployment (OR 1.9; 95 % CI 1.38–2.64; $P < 0.0001$), lack of healthcare facilities at the place of residence (OR 0.29; 95 % CI 0.22–0.35; $P < 0.0001$), low level of education (OR 2.39; 95 % CI 1.97–2.91; $P < 0.0001$).

Conclusions. It has been found that along with the traditional risk factors, the residents of the Zaporizhzhia region have other social and economic risk factors, including poor living standards, low average income, unemployment, lack of healthcare facilities at the place of residence, low level of education.

Ключові слова: артеріальна гіпертензія, фактори ризику, профілактика.

Запорізький медичний журнал. 2021. Т. 23, № 1(124). С. 42-45

Вплив медико-соціальних факторів ризику на розвиток артеріальної гіпертензії в дорослого населення на регіональному рівні

З. В. Лашкул, Д. А. Лашкул

Мета роботи – вивчення впливу медико-соціальних факторів ризику (ФР) на розвиток артеріальної гіпертензії (АГ) у дорослого населення на регіональному рівні (м. Запоріжжя, Україна).

Матеріали та методи. Здійснили дослідження, в якому після підписання інформованої згоди взяли участь 2000 пацієнтів, жителів Запорізької області: 1000 пацієнтів (522 чоловіки та 478 жінок, середній вік – 51,60 ± 0,85 року) з АГ і 1000 пацієнтів (478 чоловіків і 522 жінки, середній вік – 49,80 ± 0,94 року) без АГ. Вивчили зв'язок між АГ і дією відомих ФР, вірогідний зв'язок яких доведено багатьма дослідженнями: обтяженою спадковістю, надмірною вагою, надмірним вживанням алкоголю, курінням, гіподинамією, низкою ФР соціально-економічної спрямованості. Під час дослідження використали комплекс взаємопов'язаних і послідовно застосованих загальнонаукових і спеціальних методів: системний аналіз, бібліосемантичний, описову статистику, розраховували відношення шансів (ВШ) виникнення події з 95 % довірчим інтервалом (ДІ), p – рівень значущості.

Результати. У досліджуваній когорті під час простого логістичного регресійного аналізу виявили вірогідний ($p < 0,05$) зв'язок між АГ та обтяженою спадковістю, надмірною вагою, гіподинамією, курінням. Крім відомих ФР, для мешканців Запорізької області притаманні й інші ФР соціально-економічної спрямованості, як-от незадовільний рівень життя (ВШ 2,45; 95 % ДІ 2,04–2,94; $p < 0,0001$), безробіття (ВШ 1,9; 95 % ДІ 1,38–2,64; $p < 0,0001$), відсутність закладів охорони здоров'я в місці проживання (ВШ 0,29; 95 % ДІ 0,22–0,35; $p < 0,0001$), низький рівень освіти (ВШ 2,39; 95 % ДІ 1,97–2,91; $p < 0,0001$).

Висновки. Поряд із традиційними факторами ризику для мешканців Запорізької області притаманні й інші фактори ризику соціально-економічної спрямованості: незадовільний рівень життя, низький середній дохід, безробіття, відсутність закладів охорони здоров'я в місці проживання, низький рівень освіти.

Влияние медико-социальных факторов риска на развитие артериальной гипертензии у взрослого населения на региональном уровне

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Цель работы – изучение влияния медико-социальных факторов риска (ФР) на развитие артериальной гипертензии (АГ) у взрослого населения на региональном уровне (г. Запорожье, Украина).

Материалы и методы. Проведено исследование, в котором после подписания информированного согласия приняли участие 2000 пациентов, жителей Запорожской области: 1000 пациентов (522 мужчины и 478 женщин, средний возраст – 51,60 ± 0,85 года) с АГ и 1000 пациентов (478 мужчин и 522 женщины, средний возраст – 49,80 ± 0,94 года) без АГ. Изучена связь между АГ и действием уже известных ФР, достоверная связь которых доказана многими исследованиями: наследственностью, избыточным весом, избыточным употреблением алкоголя, курением, гиподинамией, рядом ФР социально-экономической направленности. В ходе исследования использовали комплекс взаимосвязанных и применяемых последовательно общенаучных и специальных методов: системный анализ, библиосемантический, описательную статистику, рассчитывали отношение шансов (ОШ) возникновения события с 95 % доверительным интервалом (ДИ), p – уровень значимости.

Результаты. В исследуемой когорте при простом логистическом регрессионном анализе установлена достоверная связь ($p < 0,05$) между АГ и наследственностью, избыточным весом, гиподинамией, курением. Наряду с известными ФР, для жителей Запорожской области присущи и другие ФР социально-экономической направленности: неудовлетворительный уровень жизни (ОШ 2,45; 95 % ДИ 2,04–2,94; $p < 0,0001$), безработица (ОШ 1,9; 95 % ДИ 1,38–2,64; $p < 0,0001$), отсутствие учреждений здравоохранения в месте проживания (ОШ 0,29; 95 % ДИ 0,22–0,35; $p < 0,0001$), низкий уровень образования (ОШ 2,39; 95 % ДИ 1,97–2,91; $p < 0,0001$).

Выводы. Установлено, что наряду с традиционными факторами риска для жителей Запорожской области присущи и другие факторы риска социально-экономической направленности, в том числе неудовлетворительный уровень жизни, низкий средний доход, безработица, отсутствие учреждений здравоохранения в месте проживания, низкий уровень образования.

Ключевые слова: артериальная гипертензия, факторы риска, профилактика.

Запорожский медицинский журнал. 2021. Т. 23, № 1(124). С. 42-45

The prevalence of arterial hypertension (AH) varies in world's population lives in different countries as well as in the regions of Ukraine in terms of the cultural and living standards [1]. Lifestyle, educational level, sex, age, profession, place of residence, climate and also the presence of such risk factors as smoking, excessive alcohol consumption, obesity, stressful situations, availability of medical care, coupled with the quality of providing preventive and medical care, additionally influence the prevalence of AH [2]. Therefore, the study on AH and its association with these risk factors will enable the timely management and effective clinical decision making aimed at the prevention of AH lesions and related diseases at the regional level.

Aim

To study the influence of medical and social risk factors on the development of AH in the adult population of the Zaporizhzhia region (Ukraine).

Materials and methods

This study used a cross-sectional survey to describe the association between behavioral risk factors, knowledge about hypertension, and hypertension. In order to achieve the goal, we involved 2000 persons, residents of the Zaporizhzhia Region, including 1000 patients (522 men and 478 women, mean age 51.60 ± 0.85 years) with AH and 1000 patients (478 men and 522 women, mean age 49.80 ± 0.94 years) without AH. The groups did not differ significantly by the number of people from urban and rural areas. Data were collected by an in-person interview using behavioral risk factors questionnaire, hypertension knowledge questionnaire, and physical examination. We used statistical software program (Statistica 6.0) and Microsoft Excel 2010 applications for data analysis. In accordance with target setting for meeting the objectives of the study, a set of general scientific and special interrelated and consistently applied methods were used: system analysis, bibliosemantic, descriptive statistics, calculating the odds ratio (OR) of the event with a 95 % confidence interval (CI); values of P to define statistical significance.

Results

The associations between AH and some social and economic risk factors were first studied (*Table 1*). Our study revealed a reliable relationship between AH and family history of hypertension (OR 49.78; 95 % CI 36.81–67.31; $P < 0.0001$), overweight (OR 5.92; 95 % CI 4.80–7.30; $P < 0.001$), physical inactivity (OR 2.15; 95 % CI 1.78–2.61; $P < 0.001$), smoking (OR 1.59; 95 % CI 1.31–1.93; $P < 0.0001$) and no association with excessive alcohol consumption (OR 0.84; 95 % CI 0.69–1.03; $P > 0.05$).

According to the study results, as shown in *Table 2*, excessive dietary salt intake (OR 16.09; 95 % CI 12.14–21.34; $P < 0.0001$), fatty meat and fish consumption (OR 1.41; 95 % CI 1.18–1.69; $P < 0.0001$) was significantly associated with the development of AH.

But along with the well-known risk factors which have been proven to be associated with AH by some fundamental studies, the residents of the Zaporizhzhia region are exposed to other social and economic risk factors (*Table 3*), including poor living standards (OR 2.45; 95 % CI 2.04–2.94; $P < 0.0001$), earning less than UAH 1500 (OR 3.80; 95 % CI 3.15–4.57; $P < 0.0001$), unemployment (OR 1.9; 95 % CI 1.38–2.64; $P < 0.0001$), lack of health care facilities at the place of residence (OR 0.29; 95 % CI 0.22–0.35; $P < 0.0001$), low level of education (OR 2.39; 95 % CI 1.97–2.91; $P < 0.0001$).

Discussion

Our studies have found the role of non-traditional risk factors in the development of AH using the example of the Zaporizhzhia region (Ukraine).

European guidelines on cardiovascular disease prevention focus on the identified traditional risk factors for hypertension [3]. According to the WHO recommendations, unhealthy diet is also the risk factor associated with the development of AH in the adult population [4]. Our studies confirmed the reliable relationship between the development of AH and excessive salt intake, consumption above the median level of fatty meat and fish, but inadequate consumption of vegetables and fruits. In particular, the modern scientific literature has clear evidence of excessive salt intake [5], insufficient consumption of fruits and vegetables

Table 1. The influence of medical and social risk factors on the development of arterial hypertension in the adult population, n (%)

Risk factors	Individuals with AH (n = 1000)	Individuals without AH (n = 1000)	OR (95 % CI)	P
Physical inactivity	436 (43.6)	264 (26.4)	2.15 (1.78–2.61)	<0.001
Excessive alcohol consumption	232 (23.2)	264 (26.4)	0.84 (0.69–1.03)	>0.05
Overweight	532 (53.2)	161 (16.1)	5.92 (4.80–7.30)	<0.001
Smoking	342 (34.2)	246 (24.6)	1.59 (1.31–1.93)	<0.0001
Family history of hypertension	754 (75.4)	58 (5.8)	49.78 (36.81–67.31)	<0.0001

Table 2. The influence of dietary risk factors on the development of hypertension in the adult population, n (%)

Risk factors	Individuals with AH (n = 1000)	Individuals without AH (n = 1000)	OR (95 % CI)	P
High dietary salt intake more than 5 grams per day	524 (52.4)	64 (6.4)	16.09 (12.14–21.34)	<0.0001
Excessive consumption of fatty meat and fish every day	423 (42.3)	342 (34.2)	1.41 (1.18–1.69)	<0.0001
Insufficient consumption of vegetables and fruits	854 (86.4)	245 (24.5)	18.02 (14.36–22.62)	<0.0001

Table 3. The influence of socio-economic risk factors on the development of hypertension in the adult population, n (%)

Risk factors	Individuals with AH (n = 1000)	Individuals without AH (n = 1000)	OR (95 % CI)	P
Social status – employee	878 (87.8)	740 (74.0)	2.53 (1.99–3.21)	<0.001
Low level of education	423 (42.3)	234 (23.4)	2.39 (1.97–2.91)	<0.0001
Salary less than UAH 1500	664 (66.4)	342 (34.2)	3.80 (3.15–4.57)	<0.0001
Poor living standards	670 (67.0)	453 (45.3)	2.45 (2.04–2.94)	<0.0001
Stress related profession	320 (32.0)	320 (32.0)	1.00 (0.83–1.21)	>0.05
Unemployment	122 (12.2)	68 (6.8)	1.9 (1.38–2.64)	<0.0001
Loneliness	264 (26.4)	265 (26.5)	0.99 (0.82–1.21)	>0.05
Low average income	670 (67.0)	132 (13.2)	13.35 (10.65–16.73)	<0.0001
Lack of health care facilities at the place of residence	116 (11.6)	320 (32.0)	0.29 (0.22–0.35)	<0.0001

[6], as well as fatty fish influence on the development of AH. There are many sources in the scientific literature emphasizing the linkage between metabolic status in adults and the development of AH and related diseases [7]. In population-based retrospective cohort study, the combination of diabetes and lack of habitual physical activity is predictive of functional disability in Japanese [8].

Our studies have confirmed the existence of such reliable associations between the risk factors characterizing human metabolic status and the development of AH in the adult population: blood glucose level above 6,0 mmol/l (OR 2.65; 95 % CI 1.96–3.59; P < 0.0001), cholesterol level above 4.5 mmol/l (OR 3.18; 95 % CI 2.56–3.94; P < 0.0001). Notably, the recent meta-analyses have demonstrated the effect of elevated cholesterol and glucose levels [9] on the development of AH in the adult population. Another study has found that the presence of any risk factor in essential hypertension patients has a unidirectional negative effect on the structural, geometric and functional alteration of the heart, is associated with a tendency towards reduced blood flow in all extra- and intracranial vessels. Patients with essential hypertension who smoke are characterized by activation of sympathetic autonomic nervous system [10].

A large prospective cohort study has found that independent of traditional risk factors, individual and cumulative social and behavioral risk factor exposures were associated with onset of hypertension and diabetes within 3.5 years in a clinical setting [11]. Veisani Y. et al. in cross-sectional study investigated the role of socioeconomic inequality in the prevalence of hypertension [12]. AH was more prevalent in lower socioeconomic groups and important socioeconomic contributors in inequality were job (P = 0.008), educational level (P = 0.005), and socio-economic status (P = 0.003). Cross-sectional study among 38 297 adults from China, Mexico, India, South Africa and Russia examined the association between socioeconomic status over the life-course and the burden of cardiometabolic risk factors in middle-income countries [13]. The authors concluded that higher life-course socioeconomic status for both men and women was associated with increased odds of overweight/obesity, and additionally diabetes and hypertension for men in middle-income countries. Interestingly, that among the factors influencing cardiovascular disease (CVD) risk, both lower income and residence in rural areas were associated with higher CVD risk for male and female workers [14].

Thus, our study has revealed that along with such risk factors as positive family history of hypertension, overweight, physical inactivity, excessive alcohol consumption, the residents of the Zaporizhzhia region are also exposed to some other social and economic risk factors, including poor living conditions, low average income, unemployment, lack of healthcare facilities at the place of residence, low level of education. This data are consistent with the results from other research which has shown an association of lower socio-economic position and education with an increase in all-cause mortality [15]. The intervention strategies in early life, adolescence and adulthood will likely be needed to meet future health problems.

Conclusions

It has been found that along with the risk factors such as hereditary taint, overweight, physical inactivity, excessive alcohol consumption, the residents of the Zaporizhzhia region have other social and economic risk factors, including poor living standards, low average income, unemployment, lack of healthcare facilities at the place of residence, low level of education.

Prospects for further research are to consider the regional features of the risk factor structure in the development of national programs for the prevention of CVD.

Funding

The study was conducted in the framework of the research work of State Institution "Zaporizhzhia Medical Academy of Postgraduate Education Ministry of Health of Ukraine" on the topic "Medical and social justification improvement of general practitioners/family medicine in terms of reforming health care", state registration number 0113U001603.

Conflicts of interest: authors have no conflict of interest to declare.
Конфлікт інтересів: відсутній.

Надійшла до редакції / Received: 06.07.2020
Після доопрацювання / Revised: 27.08.2020
Прийнято до друку / Accepted: 07.09.2020

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