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Risk factors of non-communicable diseases as a component of patients' health

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Фактори ризику неінфекційних захворювань як складова частина здоров'я пацієнтів

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gorlachdoc@gmail.com**Introduction**

Risk factors of non-communicable diseases (NCDs) – a topic that is not new but remains highly relevant, as despite their proven negative impact on public and individual health, they continue to be an unresolved problem for medicine and the population [1]. For a long time, experts and researchers have studied risk factors, with the greatest attention focused on those that can be prevented, as they “contribute” to the development of the most common NCDs: diseases of the circulatory system, chronic respiratory diseases, cancers, and diabetes mellitus. These diseases cause not only health impairments and, consequently, a decline in quality of life and economic costs, but also account for three-quarters of annual human deaths. The most common NCDs are closely associated with behavioral risk factors: tobacco use, harmful alcohol consumption, low physical activity, and unhealthy diet. Risk behaviors cause metabolic changes in the body – elevated blood pressure, overweight, obesity, elevated blood glucose levels, and increased cholesterol levels [2–6].

NCDs and their risk factors are constantly under the attention of governments worldwide, the medical community, and societies. The significance of NCDs and their risk factors is confirmed by periodic monitoring and analysis of their prevalence trends at the country level by international organizations such as the World Health Organization (WHO) and the Organization for Economic Cooperation and Development (OECD). Monitoring results have shown that despite some successes in several countries in reducing tobacco and alcohol use, improving nutrition, and increasing physical activity, the incidence of diabetes and obesity has been rising in recent years. In particular, obesity rates continue to increase in most OECD countries, with 54,0% of adults being overweight or obese. There is a noted decline in the number of campaigns to raise public awareness about physical activity and a reduction in efforts to develop comprehensive plans to combat NCDs and their risk factors. On average, only 15,0% of adults consume five or more servings of fruits and vegetables daily, and only

40.0% meet the recommended 150 minutes of moderate or vigorous physical activity per week [7].

In Ukraine, global trends in NCD development and the high prevalence of their risk factors are compounded by a prolonged demographic crisis, the consequences of COVID-19, and the war, making the identification of risk factors and their prevention measures part of an unresolved problem [8]. The urgency of the problem is heightened by the need to consistently include information about NCD risk factors in the health data package for the population served by healthcare institutions, taking into account the local context, which is generally lacking in current practice.

The purpose of the study is to investigate the prevalence of modifiable risk factors of non-communicable diseases (NCDs) and to propose approaches to reduce their impact on the health of patients who receive continuous care at a multidisciplinary healthcare facility.

Object, materials and methods

Object of the study: modifiable risk factors of non-communicable diseases in patients of a multidisciplinary healthcare facility, patient adherence to doctors' prescriptions; physicians' activity in implementing preventive technologies. Research methods: sociological (questionnaire survey); medical-statistical; analytical; generalisation.

The study materials consisted of questionnaires completed by patients, developed based on the WHO STEPS survey instrument [9]. Standardized questions from the main modules of the questionnaire were used, without conducting physical examinations or biochemical measurements. If 95,0% or more respondents refused to answer a particular question, the responses to that question were not analyzed.

A total of 257 patients participated in the study, selected by systematic sampling (every third patient visiting a primary care physician during the working day was surveyed), which on average accounted for 30,3%

of daily adult visits to primary care doctors at the State Institution of Science «Center of Innovative healthcare technologies» State Administrative Department, Kyiv, Ukraine, the chosen research base.

The functional-organizational structure of the State Institution of Science «Center of innovative healthcare technologies» State Administrative Department, Kyiv, Ukraine ensures the conduct of scientific research, educational activities, and the provision of primary and specialized (outpatient and inpatient) medical care. The Institution includes two primary care outpatient clinics and 21 clinical-diagnostic units. The patient population structure consists of: attached population by departmental affiliation, population served under declarations signed with general practice-family medicine doctors (therapists) and population served on a non-budgetary basis under contracts.

The study was conducted directly by nurses who underwent prior training. All respondents gave written informed consent to participate in the study.

Data processing: Statistical data processing was performed using licensed Microsoft Office Word 21 and Excel software, with calculation of relative values (percentages) and mean values \pm standard error of the mean ($M \pm m$), where M is the arithmetic mean and m is the standard error of the mean.

Research results

Analysis of demographic information showed that the average age in the sample of respondents was $54,8 \pm 1,096$ years; among them, 117 individuals were over 60 years old, with an average age of $71,4 \pm 1,086$ years. The sample was predominantly female – 181 (70,4%) compared to 76 (29,6%) males. On average, all respondents had received education starting from school level, lasting $15,7 \pm 0,2$ years, indicating a high educational level among those surveyed.

In the main module of questions "Use of tobacco and nicotine-containing products," 241 (93,8%) respondents reported smoking any tobacco products such as cigarettes, cigars, hookah, or pipes at the time of the survey. Among them, 179 (74,3%) smoked daily, while the remaining 62 (25,7%) did not smoke every day. The number of cigarettes smoked per day ranged from 1 to 30. Only 17 (7,1%) respondents reported that during any visit to a doctor or other healthcare professional in the past 12 months, they were advised to quit smoking tobacco, and among all smokers, only 13 (5,4%) tried to quit smoking during the last 12 months.

In the "Alcohol consumption" module, 18 (7,0%) respondents denied ever consuming any alcohol (such as beer, wine, spirits – alcohol-based medicines excluded), and 43 (16,7%) denied alcohol consumption in the past 12 months. Therefore, 214 (83,3%) respondents consumed alcohol in the past 12 months.

Among those who drank alcohol in the last 12 months (214 people), 93 (43,5%) consumed alcohol less than once

a month, 61 (28,5%) drank 1-3 days per month, 31 (14,5%) drank 1-2 days per week, 8 (3,7%) drank 3-4 days per week, 3 (1,4%) drank 5-6 days per week, and 18 (8,4%) drank daily.

Thus, alcohol consumption was quite common among respondents (83.3%), with weekly consumption reported by 60 (28,0%) individuals.

Answering questions from the "Dietary intake" module, respondents reported the following: fruits were consumed 1-2 days per week by 21 (8,2%) respondents, 3-4 days by 45 (17,5%), 5-6 days by 38 (14,8%), and 7 days a week by 153 (59,5%). Portion sizes were less than 400g for 213 (82,9%) and 400g or more for 44 (17,1%).

Vegetables were consumed 1-2 days per week by 4 (1,6%) respondents, 3-4 days by 18 (7,0%), 5-6 days by 38 (14,8%), and 7 days a week by 197 (76,6%). Portion sizes were less than 400g for 178 (69,3%) and 400g or more for 79 (30,7%).

Among all respondents, 58 (22,6%) always add salt or salty sauce (e.g., soy sauce) directly before or during meals, 33 (12,8%) often do, 106 (41,3%) sometimes or rarely do, and 60 (23,3%) never add salt.

Always eating processed foods high in salt (packaged salty snacks, salted canned foods including pickles and preserves, salty fast food, cheese, bacon, and processed meat) was reported by 15 (5,8%) respondents, often by 43 (16,7%), sometimes or rarely by 162 (63,0%), and never by 37 (14,4%).

Meanwhile, 35 (13,6%) respondents acknowledged they consume too much salt but continue to do so. At the same time, 109 (42,4%) stated that they do not care how much salt they consume, of which 40 (37,7%) were over 60 years old, representing 34,2% of all respondents over 60.

However, 161 (62,6%) respondents recognized that excessive salt or salty sauce intake can cause health problems, including 69 (42,9%) persons over 60 years old (58,9% of all over 60) or 26,8% of all respondents.

Analysis of the "Physical activity" module showed that only 36 (14,0%) respondents engaged in activities causing significant increases in breathing or heart rate (such as lifting heavy loads, digging, or construction work), while 221 (86,0%) did not.

Moderate-intensity activity, causing slight increases in breathing or heart rate (such as brisk walking or carrying light loads), was reported by 83 (32,3%) respondents.

Walking or cycling for transport or leisure not related to work was practiced by 174 (67,7%) respondents; among them, 37 (21,3%) did so for up to 30 minutes and 137 (78,7%) for more than 30 minutes.

Engagement in intensive sports, fitness, or recreational activities causing significant increases in breathing or pulse (e.g., running or football) was reported by 51 (19,8%) respondents.

Sitting or lying down during a typical day, including sitting at work, office, reading, watching TV, computer use, crafts, rest, etc., was reported as 1 to 4 hours by 87 (33,9%) respondents and more than 4 hours by 170 (66,1%).

Health histories revealed that most respondents – 236 (91,8%) – had their blood pressure measured by a doctor or healthcare professional at some point, with 136 (57,6%) diagnosed with high blood pressure or hypertension. Among these, 104 (76,5%) were taking medication, while 32 (23,5%) had not taken any prescribed blood pressure medication in the last two weeks.

Blood sugar was measured at least once in 212 (82,5%) respondents; 72 (33,9%) were informed of high blood sugar or diabetes, but only 22 (30,6%) had taken any prescribed diabetes medication in the past two weeks.

Cholesterol (blood fat level) was measured in 194 (75,5%) respondents, with elevated cholesterol detected in 99 (51,1%). Of these, only 49 (49,5%) took treatment prescribed for high cholesterol in the last two weeks.

Body weight and height measured during healthcare visits were reported by 237 respondents. The average Body Mass Index (BMI) in the sample was $26,9 \pm 0,22 \text{ kg/m}^2$. Among those who reported weight and height, 92 (38,8%) had normal BMI averaging $21,8 \pm 0,2 \text{ kg/m}^2$; 79 (33,3%) were overweight, including 39 (49,4%) aged over 60, with an average BMI of $27,3 \pm 0,2 \text{ kg/m}^2$.

Obesity (BMI over 30 kg/m^2) was found in 66 (27,8%) respondents, with 29 (43,9%) over 60 years old; the average BMI in this group was $33,4 \pm 0,4 \text{ kg/m}^2$.

Thus, the average BMI calculations demonstrated overweight and obesity in the majority of respondents, which combined with poor diet and low physical activity, indicated metabolic disorders.

In the last 12 months, 244 (94,9%) respondents visited a doctor or healthcare professional for various reasons. During visits, doctors advised: quitting or not starting tobacco use to 47 (18,3%), reducing salt intake to 50 (19,5%), eating at least five portions of fruits and/or vegetables daily to 59 (22,9%), reducing fat intake to 86 (33,5%), starting or increasing physical activity to 131 (50,9%), maintaining or losing weight to 104 (40,5%), and reducing sugary drink consumption to 80 (31,1%).

Discussion of research results

The high prevalence (93,8%) and intensity (from 1 to 30 cigarettes per day) of smoking among the surveyed respondents indicated significant health risks for them. Despite numerous preventive measures and anti-smoking efforts in many countries worldwide, including Ukraine, at national, local, and individual levels, the results of this study support findings from other research showing that this behavioral risk factor remains poorly controlled. Smoking is recognized as a behavioral risk factor for diseases of the respiratory organs, cardiovascular system, and other organs and systems, contributing not only to the development of non-communicable diseases (NCDs) but also to fatal outcomes. Systematic studies have not found a confirmed dependence between the duration and intensity of smoking and the risk of developing cancer of various locations. The only alternative is complete cessation of smoking [10–12].

Scientific literature includes studies indicating an increased risk from alcohol consumption depending on the daily dose, method of consumption (e.g., regular or binge drinking), and type of beverage [13–15]. Meanwhile, many studies highlight significant risks from alcohol consumption, regardless of dose, for the prevalence of cardiovascular diseases and fatal outcomes, where alcohol contributed to intentional and unintentional injuries, digestive system diseases, and other NCDs, including cancer. Researchers emphasize significant economic health costs associated with alcohol, increased impact on the development of hypertension, cardiomyopathy, atrial fibrillation and flutter, as well as stroke [16].

The analysis of respondents' diets, based on their answers, cannot be considered comprehensive since fruit and vegetable consumption was not daily for 104 (40,5%) and 60 (23,3%) respondents, respectively. Portion sizes were also insufficient for 213 (82,9%) and 178 (69,3%) individuals, being less than 400 grams. Some respondents showed a tendency for excessive salt intake and consumption of processed foods, which also have a high salt content. Scientific studies show the advisability of following healthy dietary patterns with higher consumption of vegetables, fruits, whole grains, low-fat dairy products, and seafood, alongside lower consumption of red and processed meat, refined grains, and sugary foods and beverages. Such diets provide significant benefits in preventing cardiovascular diseases, particularly risks of ischemic heart disease, stroke, heart failure, as well as stomach and lung cancer, and overall mortality [17–20].

Epidemiological, toxicological, and dietary studies have shown an association between fruit and vegetable consumption and reduced incidence of chronic diseases such as ischemic heart disease, cancer, diabetes, and Alzheimer's disease [21].

Respondents reported various types of physical activity, but the largest proportion – 170 (66,1%) – indicated a sedentary lifestyle, spending more than 4 hours typically sitting or lying down, which is considered extremely harmful to health. Studies have found that individuals who mainly sat at work had a 16% higher risk of all-cause mortality and a 34% higher risk of cardiovascular mortality compared to those who mostly did not sit at work [22]. It has been shown that a high level of overall physical activity, leisure-time activity, occupational activity, walking, and cycling together are associated with a reduced risk of developing heart failure [23]. A connection has been established between moderate and vigorous physical activity ≥ 150 minutes per week and a lower risk of cardiovascular diseases in patients aged 30–39 and ≥ 50 years [24]. Additional problems due to a physically inactive lifestyle include osteoporosis, arthritis and/or other skeletal disorders, reduced ability for normal social interaction, and a general decline in quality of life [25].

A significant portion of respondents did not take prescribed medications despite identified health problems. Analysis of scientific studies has shown that patient

adherence to treatment is influenced by many factors: sex, age, marital status, education level, occupation, health status, number of family members, contract with a family doctor, patient trust, and satisfaction with medical care at the healthcare facility [26–28]. Researchers consider nursing care importance [29] and patient involvement in the treatment process [30] as significant predictors of patient adherence.

Only a minority of respondents—ranging from 18,3% to 50,9%, depending on the topic—reported receiving advice from doctors to avoid or reduce unhealthy behavior. However, doctors and other medical professionals must recognize the importance of health education and teaching patients skills to strengthen and protect health and prevent diseases, as healthcare workers are the driving force behind ensuring population health and achieving positive well-being [31–33].

Thus, the study results in quantitative terms showed that the majority of surveyed patients practice behavioral risk factors, increasing the likelihood of developing or manifesting existing NCDs and demonstrating low patient adherence to treatment of the consequences of these factors. There is also insufficient attention from primary healthcare doctors to the prevention of modifiable NCD risk factors in patients.

Prospects for further research

Future prospects of this research include ongoing monitoring of NCD risk factors, the development and implementation of improved prevention and avoidance

technologies, and the evaluation of their effectiveness in real clinical practice.

Conclusions

Risk factors for non-communicable diseases (NCDs) – such as smoking, insufficient consumption of fruits and vegetables, excessive intake of salty foods, and low physical activity – are characteristic of the majority of surveyed respondents.

Low patient adherence to medical prescriptions aimed at correcting arterial hypertension, elevated blood glucose, and cholesterol levels has been identified. Furthermore, insufficient preventive activity among physicians was confirmed, particularly in terms of involving patients in health education and behavior modification to reduce exposure to NCD risk factors.

Prevention of NCD risk factors and the promotion of healthy behavior remain pressing national, sectoral, and local challenges. Healthcare institutions should focus on improving communication with patients, increasing patient satisfaction with medical services, fostering adherence to medical recommendations, and enhancing the preventive activities of healthcare professionals.

Widespread implementation of preventive programs at both individual and population levels is advisable, alongside close collaboration between healthcare providers, public health professionals, mass media, and local government representatives to promote preventive technologies within communities and specific population groups.

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Purpose. This study addresses the persistent problem of non-communicable disease (NCD) risk factors. Its purpose was to investigate the prevalence of controlled risk factors and propose strategies for mitigation. The research focused on NCD risk factors, patient compliance, and physician preventive activity.

Materials and methods. Methods included a sociological questionnaire survey (based on WHO STEPS) of 257 patients from the State Scientific Institution «Center for Innovative Healthcare Technologies», alongside medical-statistical, analytical, and generalization approaches.

Results. Results revealed alarmingly high prevalence: 93.8% of respondents (74.3% daily) smoked tobacco; 83.3% consumed alcohol in the last year (28.0% weekly at risk levels). Unhealthy eating was widespread, with 40.5% not daily consuming fruits and 23.3% vegetables; low portion sizes were common. Over 66% reported sedentary lifestyles. A significant number did not take prescribed medications for hypertension (23.5%), high blood glucose (69.4%), or high cholesterol (50.5%). Physician recommendations for healthy behaviors were inconsistently received (18.3–50.9%).

Conclusion. In conclusion, controlled NCD risk factors are prevalent, compounded by low patient compliance and insufficient physician preventive action. Widespread implementation of individual and population-level preventive programs, involving public health specialists, media, and local government, is crucial for promoting health technologies in communities.

Key words: tobacco smoking, alcohol consumption, rational diet, physical activity, unhealthy behavior, prevention technologies, patient compliance.

Мета. Основною метою дослідження було детально вивчити поширеність ключових керованих факторів ризику неінфекційних хвороб серед певної групи пацієнтів для формування й обґрунтування практичних підходів, що дадуть змогу поліпшити профілактику НІХ, підвищити якість життя, зменшити тягар хвороб і забезпечити більш ефективну роботу первинної ланки медичної допомоги.

Матеріали та методи. Об'єкт дослідження: керовані фактори ризику неінфекційних захворювань; лояльність пацієнтів до призначень лікарів; активність лікарів із запровадження профілактичних технологій. Методи дослідження включали соціологічний (анкетне опитування пацієнтів), медико-статистичний, аналітичний, а також методи узагальнення. Матеріалами слугували заповнені пацієнтами анкети, розроблені на основі опитувальника STEPS Всесвітньої організації охорони здоров'я. Було опитано 257 пацієнтів, які звернулися за медичною допомогою до Державної наукової установи «Центр інноваційних технологій охорони здоров'я» Державного управління справами.

Результати. Отримані результати демонструють високу поширеність керованих факторів ризику серед обстежених пацієнтів. Зокрема, 93,8% респондентів (241 особа) мали досвід куріння тютюнових виробів, при цьому 74,3% (179 осіб) курили щодня. Кількість викурених сигарет на добу коливалася від 1 до 30, що вказує на різний ступінь залежності. У 83,3% (214 осіб) було зафіксоване вживання алкоголю протягом останнього року, а 28,0% (60 осіб) споживали щонайменше одну стандартну дозу щотижня, що підвищує ризики хронічних захворювань. Окремі пацієнти вказували на вживання алкоголю в стресових ситуаціях, що потребує додаткового психологічного супроводу.

Раціон респондентів також виявився далеким від рекомендованих норм: 40,5% (104 особи) не споживали фрукти щодня, а 23,3% (60 осіб) – овочі. Недостатнє вживання фруктів (менше 400 г на добу) спостерігалось у 82,9% (213 осіб), овочів – у 69,3% (178 осіб). Надмірне споживання солі також поширене явище: 22,6% (58 осіб) завжди додавали сіль або солоні соуси до їжі, 12,8% (33 особи) робили це часто, що значно підвищує ризик розвитку артеріальної гіпертензії.

Фізична активність також є недостатньою: 66,1% (170 осіб) проводили в сидячому або лежачому положенні понад чотири години на добу, що свідчить про гіподинамію. Ще однією проблемою виявилася низька прихильність до лікування: 23,5% (32 особи) з артеріальною гіпертензією не приймали ліки; 69,4% (50 осіб) із підвищеним рівнем глюкози та 50,5% (50 осіб) із підвищеним холестерином також не отримували лікування. Лише 18,3–50,9% респондентів отримували рекомендації від медиків щодо модифікації поведінки, що вказує на низький рівень профілактичної активності. Це може свідчити як про перевантаження лікарів, так і про відсутність достатньої мотивації до профілактики.

Висновки. Керовані фактори ризику неінфекційних захворювань поширені серед більшості обстежених пацієнтів, при цьому спостерігається низька прихильність до медичних рекомендацій та недостатній рівень профілактичної роботи лікарів. Для поліпшення ситуації необхідне впровадження системних профілактичних програм як на індивідуальному, так і на популяційному рівні. Рекомендується тісна міжсекторальна взаємодія – із фахівцями громадського здоров'я, органами місцевої влади, ЗМІ, громадськими організаціями – з метою популяризації здорового способу життя, формування відповідального ставлення до власного здоров'я та подолання бар'єрів до зміни поведінкових звичок у різних вікових і соціальних групах населення. Окрему увагу слід приділяти підвищенню кваліфікації медиків у сфері профілактики та комунікації з пацієнтами.

Дослідження проведено відповідно до теми науково-дослідної роботи Державної наукової установи «Центр інноваційних технологій охорони здоров'я» Державного управління справами «Медико-соціальне обґрунтування, розроблення та запровадження моделі «Центр інноваційних технологій охорони здоров'я» на основі триєдності науки, освіти та практики в роботу багатопрофільного закладу охорони здоров'я і визначення її ролі у формуванні єдиного медичного простору», номер державної реєстрації 0125U0000318.

Ключові слова: куріння тютюну, вживання алкоголю, раціональна дієта, фізична активність, нездорова поведінка, технології профілактики, лояльність пацієнтів.

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