COMPLEX ASSESSMENT
OF THE HEALTH OF POPULATION
BASED ON INTEGRAL INDICATORS

Guidelines to the practical lesson
for students in the specialties 222 "Medicine"
*and 228 "Pediatrics" on the course **"Social Medicine,***
Public Health (Public Health)"

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КОМПЛЕКСНА ОЦІНКА СТАНУ ЗДОРОВ'Я НАСЕЛЕННЯ НА ОСНОВІ ІНТЕГРАЛЬНИХ ПОКАЗНИКІВ

Методичні вказівки
до практичного заняття студентів
спеціальностей 222 «Медицина» та 228 «Педіатрія»
*з дисципліни «**Соціальна медицина, громадське здоров'я» (Громадське здоров'я)***

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LESSON METHODS

The purpose of the lesson: to master integrated methods for assessing public health at the population level.

Need to know:

program issues:

application of statistical methods for determining and assessing the health status of the population in conjunction with the factors that determine it (relative and average values, standardization method, correlation and regression analysis, assessing the reliability of the results of statistical studies using parametric and nonparametric methods) determination of the main integral indicators of the health status of the population ; determination of the sources and/or location of information for the study and assessment of the health status of the population (demographic indicators, incidence, disability and others); a comprehensive assessment of the demographic situation in conjunction with the factors that affect it; determining the rating of individual regions of Ukraine by demographic indicators; rating assessment of the state of primary and general morbidity in different regions of Ukraine; development of management decisions aimed at improving public health.

Main international and national regulatory documents on public health:

– Constitution of Ukraine (adopted by the Verkhovna Rada of Ukraine on June 28, 1996);

– Fundamentals of Ukrainian legislation on health care (adopted by the Verkhovna Rada of Ukraine on November 19, 1992 No. 2801-XII);

– Fundamentals of Ukrainian legislation on compulsory state social insurance (No. 16/98-BP of January 14, 1998).

– Law of Ukraine "On ensuring the sanitary and epidemiological well-being of the population" (February 24, 1994)

– The Law of Ukraine "On the Protection of Childhood", No. 2402-III of April 26, 2001;

– Intersectoral comprehensive program "Health of the nation for 2002–2011";

– National programs: Children of Ukraine; Family planning; Improving the status of women; Protection of motherhood and childhood; education; Disability issues; Support program for breastfeeding children and others.

Accounting and reporting documentation:

– Medical birth certificate 103/o 95

– Medical death certificate 106/o-95

– Medical certificate of perinatal death 106-2/y-95

– Death certificate given by paramedic 106-1/y-95

– The register of the reception of pregnant women in childbirth 002/o

– Medical card abortion 003-1/o

– Journal of birth records in hospital 010/o

– The history of the development of the child 112/o and others.

Need to be able to:

– identify and interpret medical indicators of population health;

– determine and analyze the influence of the main factors determining the state of public health.

Form of the lesson: practical lesson.

Lesson location: training room of the department.

Methodical support of the lesson:

–methodological developments for classes;

–methodical literature: workbook for students (basic training);

–presentation materials;

– test items.

Recommended literature
Basic literature

1. Little William Chapter 19. Health and Medicine // In: Introduction to Sociology, 1st edition. / W. Little. – Victoria: Rice University, 2014. – 36-45p. URL:
https://opentextbc.ca/introductiontosociology/chapter/chapter19-health-and-medicine/

2. Conrad P, Barker KK The social construction of illness: key insights and policy implications. J Health Soc Behav. 2010;51 Suppl:S67-79. Doi: 10.1177/0022146510383495. URL:
http://www.ncbi.nlm.nih.gov/pubmed/20943584

3. Fran Baum The New Public Health. 4th edition / F. Baum. Oxford: Oxford University Press, 2016. – 720 p. URL:
https://gloubal.oup.com/academic/product/the-new-public-health-9780195588088?cc=ua&lang=en&

4. Talbot Lyn, Verrinder Glenda Promoting Health: The Primary Health Care Approach, 6th edition / L. Talbot, G. Verrinder. – Australia: Elsevier, 2017. – 400 p. URL:
https://elsevier.com/books/promoting-health/talbot/978-0-7295-4257-9

5. Vivian Lin, James Smith and Sally Fawkes Public Health Practice in Australia. The organized effort / V. Lin et al. – Australia: A&U Academic, 2014. – 560 p. URL:
https://www.allenandunwin.com/browse/books/academic-professional/health/Public-Health-Practice-in-Australia-Vivian-Lin-James-Smith-and-Sally-Fawkes-9781743314319

6. Methodical materials on the subject "Public Health".

7. Summary of lectures in Social Medicine and Public Health / Kharkiv National Meedical University, Department of Public Health and Healthcare Management

Additional literature

1. Gebbie K, Rosenstock L, Hernandez LM Who Will Keep the public Healthy? Educating Public Health Professionals for the 21st Century / K. Gebbie et al. – Washington D.C.: National Academy Press, 2003. – P. 33–144.
2. Last John M. A Dictionary of Epidemiology 4th edition. Ed. by International Epidemiology Association / J. Last – New York, NY: Oxford, University Press, 2001. – 219 p. URL: https://pestcontrol.ru/assets/files/biblioteka/file/19-john_m_last-a_dictionary_of_epidemiology_4th_edition-oxford_university_press-usa_2000.pdf
3. Lorber, J. Women Get Sicker, but Men Die Quicker : Gender and Health / J. Lorber. / In Phil. Brown ed. Perspectives in Medical Sociology. – Illinois: Waveland Press, 2000. – P. 40–70.

Information Resources

1. U.S. National Library of Medicine – http://www.nlm.nih.gov/
2. University of West Florida − University libraries. LibGuides. Public Health. Statistics and Data https://libguides.uwf.edu/c/php?g=435443&p=2968919
3. Scientific Library of Kharkiv National Medical University – http://libr.knmu.edu.ua/index.php/biblioteki
4. Vernadsky National Library of Ukraine – http://www.nbuv.gov.ua/
7. National Scientific Medical Library of Ukraine – http://www.library.gov.ua/
8. Korolenko State Scientific Library – http://korolenko.kharkov.com
10. Central Scientific Medical Library of Sechenov State Medical University in Moscow – http://www.scsml.rssi.ru

BASIC THEORETICAL MATERIAL FOR PREPARING FOR THE LESSON

1. The essence and approaches to assessing public health

Social medicine and the organization of public health study the patterns of public health and its system of protection. For many years, the state of population's health was assessed in a number of countries on the basis of **an complex approach** to the definition of "public health" of the population. This implies that this is a conditional statistical concept, due to **the complex effect**

of various factors (social, biological, environmental factors) and is **evaluated**:

1. Demographic indicators (mortality, birth rate, natural population growth, average life expectancy, etc.);

2. Morbidity indicators (general, epidemic, major diseases, hospitalized and morbidity with temporary disability);

3. Physical development indicators of population:

– anthropometric – standing growth, body weight, chest size;

– functional, Physiometric – vital capacity of the lungs (spirometry), muscle strength of the hand (dynamometry), etc.;

– somatoscopic – body structure, muscle development, shape of the chest, legs, severity of secondary sexual characteristics, pulse, blood pressure and others.

4. Disability indicators (indicators of general and primary disability, etc.);

5. The prevalence of prenosological conditions.

To determine these indicators and assess health status, various statistical methods are used: relative and average values, standardization method, correlation and regression analysis, estimation of the probability of the results of a statistical study using parametric and non-parametric methods.

In Ukraine, there is a significant territorial differentiation of birth rates. Relatively high (over 11 births per 1000 population) frequency compared with the general level in Ukraine is observed in the Western region: Rivne, Volyn and Zacarpathian regions. At the same time, in the eastern regions (Donetsk, Lugansk, Kharkov), in the Crimea and in Kiev, birth rates are low (7.5 %).

As for mortality, its highest levels occur in the Southeast region, and then in the Central region. In the regions, high mortality rates in recent years are recorded in Chernihiv, Sumy, the lowest - in the Zacarpathian region and in Kiev.

An analysis of regional characteristics of the morbidity rate in Ukraine shows that the prevalence of diseases compared with the data for Ukraine was higher in the Volyn, Chernihiv, Vinnitsa and Cherkasy regions, and the primary morbidity was in the Lviv, Chernihiv, Volyn regions and Kiev. The differences in morbidity rates in individual regions of Ukraine are significantly affected by the composition of the population by age and sex, the completeness of disease registration, and the combination of the effects of various environmental factors.

The study of population health is based on numerous sources, the main of which are:

– official reports of medical institutions and health authorities, social insurance, registry offices and statistical authorities;

– specially organized registration of cases of morbidity and mortality in medical institutions, allocated observation zones - prospective studies;

– retrospective information of reporting documents of medical institutions for the past period of time;

– electronic databases of the health system;

– population survey data;

– data from medical examinations;

– data from laboratory and instrumental studies;

– the results of mathematical modeling.

In the second half of the twentieth century, in the developed countries of the world, various international integral indicators of population health began to be used. All of them were developed and proposed by WHO experts, an important place among them are:

– viability coefficient;

– human development index (HDI)

– indicator of the survival of the population up to a certain age (up to 1, 5, 15, 45 and 65 years)

– index "DALY";

– Delphi index;

– a technique based on assessing the quality of life of the population;

– infant mortality;

– average life expectancy, etc..

The vitality coefficient began to be applied from the mid-60s to the present. It is determined on the basis of indicators such as:

– average life expectancy;

– infant mortality;

– the quality of food;

– budget expenditures for social, medical and environmental programs.

The critical value of this coefficient is at the level of 1 point, the maximum - 5 points. Today there is no country in the world that needs the maximum coefficient of resilience, countries such as Sweden, Belgium, the Netherlands, Luxembourg had 4 points, and the USA, Japan had 3 points.

UN Research Group in 1990 was proposed special indicator – the Human Development Index (HDI). It combines three indicators (GDP per capita in dollar terms), literacy (adult literacy rate of the country is 2/3 of the index and the total share of students is 1/3 of the index) and average life expectancy is in years, which gives an integrated assessment of human progress.

To date, the HDI has been modified in two of its components: indicators of education and income (GDP per capita). The education indicator is defined as the literacy of the population, taking into account the average number of years of study. In the field of income, the average global GDP per capita is used as a threshold value.

Depending on the value of the HDI, it is customary to classify countries according to the level of development: very high (more than 0.900), high (0.800 ... 0.899), medium (0.500 ... 0.799) and low (less than 0.500).

The highest level of human development index are countries such as Iceland, Norway, Canada, Australia, Ireland, Sweden, Netherlands, Japan, Luxembourg, France, Finland, Denmark, Austria, USA – 0.950-0.968.

According to the UN, 30 out of 32 countries with low HDI are located in Africa, one in North America (Haiti), one in Asia (Yemen), among them with the lowest rates Sierra Leone, CAR, Congo, Liberia, Mozambique, Niger – 0.29–0.37.

The lowest index indicators in Europe are countries such as Moldova (0.719), Georgia (0.780) and Ukraine (0.786).

An alternative human development index is the Poverty Index (developed by the UN to assess the quality of life of the population). It is published annually by the United Nations and calculated according to three main indicators: life expectancy at birth, level of education of the population, level of real income of the population).

In Ukraine, the methodology for determining the human development index is used, which is adapted to national conditions, primarily in the national statistical base. The methodology was developed by the Goskomstat together with the Council for the Study of the Productive Forces of the NAS of Ukraine. According to this technique, the human development index is determined on the basis of 9 groups of indicators: demographic development, labor market development, material well-being, living conditions of the population, state and healthcare, educational level, social environment, financing of human development and environmental situation.

According to the State Statistics Committee, such territorial entities have a high human development index in Ukraine: Kiev (0.683), Sevastopol (0.592), Poltava region (0.565), Crimea (0.558), Kharkiv region (0.543). The smallest - Lugansk (0.384), Donetsk (0.423), Nikolaev (0.448), Kherson (0.462).

In recent years, **international practice has widely used the survival rate** as proposed by WHO of the age limits of up to 1 year, up to 5 years, up to 15 years, up to 45 years, up to 65 years, which is calculated on the basis of mortality rates in age groups and reveals the reasons for its formation.

The DALY index relates mortality from individual causes to the potential loss of life or poor life. The indicator of potentially lost years of life over the period 0–65 years among men is almost 3 times higher than among women, they die at a much older age.

Mortality of children under the age of one year is one of the most sensitive indicators of the level of socio-economic development of a society, it accumulates the level of education and culture, the environment, the effectiveness of preventive measures, the level of accessibility and quality of medical care, the distribution of social and material benefits in society.

Among the demographic indicators, there is one more that is used for an integrated assessment of the state of public health – **the average life**

expectancy. This indicator is particularly affected by the increase in mortality among children, youth and people of working age. Therefore, it has more practical significance than the general mortality rate, which is significantly affected by the high frequency and proportion of mortality of the population of working age.

2. Risk factors and their classification

The so-called risk factors play an important role in shaping the level of public health. **Risk factors** are factors that contribute to poor health, disease, or death.

Risk factors for the disease can be of endogenous or exogenous origin, and they, in turn, are divided into controlled and uncontrolled.

According to the classification of the American researcher A.I . Robbins, 1980, factors affecting health can be divided into 4 large groups:
 – lifestyle;
 – biological factors;
 – state of the environment;
 – volume and quality of medicine.
The intensity of the impact of these groups of factors varies significantly.

Classification of risk factors by A. I. Robbins

Group of risk factors	The share of influence (%)
1. Lifestyle: poor living conditions, poor nutrition, unhealthy work, stress, lack of exercise, single-parent, large families, smoking, alcohol abuse, etc.	51–52
2. Environment: polluted air, water, food, soil, radiation level, electromagnetic field.	20–21
3. Biological factors: heredity, constitution, gender.	19–20
4. Medical factors: vaccinations against infections, medical examinations, quality of treatment, medical examination.	8–9

The first place in terms of the impact on public health in modern conditions is occupied by lifestyle factors, they account for 51–52 %.

Among the leading lifestyle factors that negatively affect health are the following: poor living conditions, poor nutrition, unhealthy work, stress, physical inactivity, incomplete, large families, smoking, alcohol abuse, excessive levels of urbanization, etc.

In second place are environmental factors (soil, water, air, food, radiation level). The influence of these factors is about 20–21 %.

In third place in terms of the impact on health are biological factors (gender, age, heredity, constitution). They account for about 19–20 %.

In fourth place, medical factors – treatment and prophylactic and sanitary-anti-epidemic measures (vaccinations against infectious diseases, the

quality of treatment and examination of patients, etc.) - determine the state of health by 8–9 %.

After these data, an important conclusion can be drawn: the main direction of efforts to preserve and strengthen the health of the population is to improve the conditions and lifestyle of people and the environment.

Depending on the state of health of the population, 5 health groups are currently distinguished:

1. Healthy (0-1 cases of acute respiratory diseases per year).

2. Practically healthy (persons with a risk factor, premorbid state, no more than 2-3 cases of acute respiratory diseases per year).

3. Patients with a compensated condition (persons with chronic diseases without exacerbations, 4 or more cases of acute respiratory diseases per year).

4. Patients with a subcompensated state (persons with exacerbations of chronic diseases during the year).

5. Patients with a decompensated state (chronic patients in the stage of decompensation).

The general trends of the main indicators of the health of the population of Ukraine at the present stage can be determined as follows:

– demographic situation: urbanization, population aging, a change in the structure of mortality and a decrease in the average life expectancy are taking place;

– morbidity of the population: a non-epidemic type of pathology has developed, the level of certain diseases has increased, in particular non-epidemic, endocrine, allergic, the frequency of certain infectious diseases (tuberculosis, diphtheria, hepatitis, HIV infection, etc.) has increased; the tendency for a combination of pathology among the population has increased;

– physical development of the population: the number of children with disharmonious development increases, the number of healthy children decreases;

– disability: the primary disability rate is increasing.

The World Health Organization, in its general strategy for national health services, "Health for All in the Twenty-First Century," has identified the criteria that all countries should strive for. For Ukraine, they can be as follows:

1. Full accessibility of primary health care.

2. The percentage of gross national product allocated to health care should be 7-8%, practically its share is not more than 3.5 %.

3. Positive natural population growth in all areas (now in Ukraine the natural growth is negative and amounts to 7.5 per 1000 population).

4. The percentage of children who give birth with a body weight of 2 500 grams or less (may be no more than 3.5 %). Currently 5.5 %.

5. The level of child mortality (should not exceed 9 per 1000 live births, in fact, over the past years it has been 9.7 ‰).

6. The average life expectancy from birth (may be at least 75 years, and is 67.6–68.0 years).

INDEPENDENT WORK

Based on your own data, evaluate your quality of life. To do this, you must answer the questions in the above questionnaire. After self-assessment, the number of points scored together and, using the formula below, calculate the percentage of quality of life. Draw a conclusion and develop measures to improve the quality of life. A population-based assessment of quality of life is defined as the average acount of individuals making up the population. Wish you success.

Student quality of life questionnaire
Researcher's signature _____

I. Choose your answer to the following questions:

№ p/p	Question	Answer options	Estimation of measurement gradation
1.	How limited are you in physical education and sport?	1. Full restrictions. 2. Great restrictions. 3. Moderate restriction. 4. Minor restrictions. 5. There are no restrictions.	4 3 2 1 0
2.	How often do you need rest during the work day?	1. Constantly in need. 2. A substantial part of the time. 3. Half the time. 4. A short period of time. 5. I do not need.	4 3 2 1 0
3.	How often do you have trouble sleeping?	1. Constantly. 2. Quite often. 3. Rarely. 4. Very rarely. 5. No problem.	4 3 2 1 0
4.	How often do you have periods of bad mood?	1. Constantly. 2. Quite often. 3. Rarely. 4. Very rarely. 5. No problem.	4 3 2 1 0
5.	How often do you feel afraid for your future?	1. Constantly. 2. Quite often. 3. Rarely. 4. Very rarely. 5. No problem.	4 3 2 1 0

№ p/p	Question	Answer options	Estimation of measurement gradation
6.	How often do you feel the limitations in the processes of memorization, thinking, quick-wittedness?	1. Constantly. 2. Quite often. 3. Rarely. 4. Very rarely. 5. No problem.	4 3 2 1 0
7.	How much are you capable of controlling your actions with an effort of will and not experiencing any restrictions?	1. I do not control. 2. Slightly in control. 3. Moderate control. 4. In most cases, I control. 5. I have complete control.	4 3 2 1 0
9.	How limited are you in choosing a hobby (favorite activity) for your health?	1. Full restrictions. 2. Great restrictions. 3. Moderate restriction. 4. Minor restrictions. 5. There are no restrictions.	4 3 2 1 0
10.	How limited are you in actively participating in the public life of the group and course?	1. Full restrictions. 2. Great restrictions. 3. Moderate restriction. 4. Minor restrictions. 5. There are no restrictions.	4 3 2 1 0
11.	How often, when planning your leisure, do you feel limited by your health?	1. Constantly. 2. A significant part of the time. 3. Half the time. 4. A short period of time. 5. No.	4 3 2 1 0
12.	How much are you limited in attending theaters, concerts due to your health?	1. Full restrictions. 2. Great restrictions. 3. Moderate restriction. 4. Minor restrictions. 5. There are no restrictions.	4 3 2 1 0
13.	How limited are you in observing religious rites?	1. Full restrictions. 2. Great restrictions. 3. Moderate restriction. 4. Minor restrictions. 5. There are no restrictions.	4 3 2 1 0
Q – Total absolute indicator of quality of life			52
Q_i – Individual total points of the person being examined			

Substitute the obtained results in the formula:

$$QL = 100 - \left(\frac{Q_i}{Q} \times 100\% \right) = \qquad \%$$

QL – relative indicator of the quality of life of the person being examined;
Q_i– individual total points of the person being examined;
Q – total absolute indicator of the quality of life for a particular questionnaire. In the proposed questionnaire, this is 52 points.

Conclusion:_____
_____
_____
_____

Recommendations for improving the quality of human life
_____
_____
_____
_____
_____

CONTROL QUESTIONS

1. The definition of individual, group, regional and population health.
2. The main methods of studying the state of public health.
3. What is meant by a complex method of studying the state of "health" of the population?
4. What is meant by integrated methods of studying the state of "health" of the population? List the main integral methods.
5. What are the sources of studying population health?
6. Regional features of the state of health of the population of Ukraine.
7. Assessment of the health status of the population based on the coefficient of vitality.
8. Human Development Index (HDI), its indicators and assessment.
9. The indicator of the survival of the population to a certain age (up to 1, 5, 15, 45 and 65 years).
10. The essence of the assessment of population health based on the DALY Index.
11. The main provisions of the methodology for assessing the quality of life of the population.
12. Medical and social significance of child mortality and role in assessing population health.
13. Medical and social significance of the average life expectancy of the population and its role in assessing population health.
14. What are the risk factors that are involved in the formation of public health? Their classification.
15. What are the health groups of the population, the importance of the allocation of health groups for practical health?
16. General trends of the main indicators of the health of the population of Ukraine.
17. What are the criteria for achieving a certain level of health for the population of Ukraine, defined by WHO experts?

CONTENT