LECTURE COMPLEX

Name of the discipline: "fundamentals of Evidence-Based Medicine"
Subject Code: DMN 4301
Title of the EP: "general medicine"
Training hours / credits: 90 hours (3 credits)
Course and semester training: 4th year, VIII semester
Lecture Volume: 5 hours

Shymkent 2023

The lecture complex was developed in accordance with the educational program" general medicine " and was discussed at the meeting of the Department.

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1.Topic # 1: Introduction to Evidence-Based Medicine. Application in medical practice.
2. purpose: to familiarize students with evidence-based medicine. Consideration of the field of practical application of DM in medicine.
3. lecture theses:

Evidence — based medicine (Evidence-based medicine) is a division of evidence-based medicine (Evidence-Based Medicine Working Group, 1993) that aims to disseminate evidence-based evidence for research, comparison, generalization, and use in the interests of patients.

Evidence — based medicine is a new way, direction, or technology for collecting, analyzing, generalizing, and interpreting scientific information. Evidence-based medicine uses the best modern advances to treat every patient (Sackett D. L.et al., 1996). The main goal of introducing the principles of evidence — based medicine into healthcare practice is to optimize the quality of medical care in terms of safety, efficiency, cost and other important factors.

The term" Evidence-based medicine " was first coined in 1990 by a group of Canadian scientists from Mack master University in Toronto. The term quickly entered the English-language scientific literature, but there were no clear definitions of it yet. It can be said that even at the moment there is no single definition of evidence — based medicine-in the literature we find 10 different options.

Not a single practicing doctor has sufficient experience that allows him to freely navigate in all the variety of clinical situations. It is possible to rely on the opinions of experts, authoritative guidelines and definitions, however, this is not always reliable due to the delayed effect — promising therapeutic methods are put into practice a significant amount of time after receiving evidence of their effectiveness (Antman E. T.et al., 1992). On the other hand, information in textbooks, manuals, and reference books is often outdated before they are published, and the age at which an experienced doctor conducts treatment is determined by the effectiveness of the treatment (Sackett D. L.et al., 1991). These conclusions are based on the fact that the main statistical tool of evidence — based medicine is metaanalysis (V. A. Gorkov et al. , 1998).

The main development trends of biomedical science determine the following factors:
globalization of Information Processes;
a large number of ongoing biomedical research;
a wide range of drugs (DZ) in pharmaceutical markets;
increasing the flow of medical information (about 40,000 biomedical journals are published each year, publishing about 2 million articles) (Oxman A., Guyall G., 1988);
The problem of rational spending of funds in the healthcare system is acute.

These main trends determine the following needs of practical medicine:
the need for a critical assessment of information for practitioners and health leaders;
the choice of systemic approaches to decision-making in medicine (therapeutic, diagnostic, managerial, etc.).

Consequently, there is a need to generalize biomedical knowledge and widely inform the medical public about the results of new research.

The potential opportunities for applying the principles of evidence-based medicine in healthcare practice are important. Their use in the first place makes it possible to use objective criteria for all aspects of pharmacotherapy. The principles of evidence-based medicine, taking into account new and reliable information, make it possible to optimize the influence of many subjective factors on decision-making, such as the intuition and qualifications of a doctor, the opinion of authoritative experts, recommendations of popular guidelines and definitions. Thus, evidence-based medicine seeks to combine the individual clinical experience of a physician with the best available independent clinical evidence from systematized research.

At the same time, the principles of evidence-based medicine make it possible to develop the most effective, safe and economical modern therapeutic strategies that can be implemented at the state, regional, population, subpopulation and individual levels, contributing to the choice of the optimal option in each specific clinical case.

Let us dwell on some aspects of the practical application of the principles of evidence-based medicine. First of all, they are used to improve the quality of medical care: this is the development of clinical recommendations for practitioners and the introduction of a standardization system for healthcare.

Clinical recommendations for practitioners allow you to improve the work of the doctor in relation to the following aspects:
determining the tasks facing the doctor;
description of the disease (etiology, prevalence, clinical picture, etc.).);
algorithms of diagnostic procedures (examination program, indications and contraindications for the appointment of diagnostic manipulations));
treatment (tactics, characteristics of specific DZ and treatment measures, criteria for the effectiveness and termination of treatment); complications, prognosis, indications for hospitalization, dispensary control, etc.
Implementation of the standardization system in healthcare:
LS application area;
development and application of medical equipment;
development of a formulary system (protocols for the conduct and treatment of patients);
development and use of protocols in insurance medicine;
to determine the relative value of various sources of information regarding the search for answers to clinical questions.
An important aspect of evidence-based medicine is to determine the degree of accuracy of Information: research results that are taken as a basis when conducting a systematic review.
The Oxford Center for Evidence-Based Medicine has developed the following definitions of the level of accuracy of the information provided:

A.high accuracy-the information is based on the results of several independent clinical trials (Ki), the results generalized in Systematic Reviews coincide.
B. average accuracy-the information is based on at least a few independent results for Ki purposes.
C.limited reliability-information is based on the results of a single Ki.
D.there is no hard scientific evidence (Ki has not been held) — some assertion based on the opinion of experts.
According to the Swedish Council for assessment methodology in health care, the validity of evidence from various sources is not the only one and is discarded in the following order (Li Wan Po, 1998):
1) randomized controlled Ki;
2) andomized Ki with simultaneous observation;
3) NANDOMIZED Ki with historical control;
4) cohort research;
5) study of the" case-control "type";
6) wear a cross;
7) control results;
8) description of individual cases.
Search and analysis of evidence-based information
Information search in the field of evidence-based medicine requires the researcher to use appropriate experience and a systematic approach. Of great importance for the successful search for the necessary information on evidence-based medicine issues is the selection of available clinical databases (MedLine, Cochrane Library, Adonis, etc.) and the development of an adequate search methodology (by key words or phrases, names of authors, etc.).
4. illustrative material: presentation (13 slides are attached)
5.literature: see Appendix 1.
6. Control questions (feedback):
1. what is the term evidence-based medicine?
2. What are the basic principles of DM?
3. where is DM used?
4. What are the features of practical application in medicine?
1. Topic # 2: Methodology and basic principles of Evidence-Based Medicine.
2. purpose: to get acquainted with the basic principles and methods of Evidence-Based Medicine.
3. lecture theses:
The need for professional medical information can affect the fact that the doctor appears 60 times a week (or twice for every three patients) and makes at least eight decisions every day.
Real clinical practice always experiences some difficulties in answering the question: What is important for clinical decision - making-recommendations made based on the

results of clinical trials or medical thinking and experience in relation to each specific patient? The answer to this question seems contradictory to many critics of the DM concept (fig. 2).
However, the paradoxical, presented in the picture" triad", most fully describes the current approach to evidence-based medicine.
A competent clinician always uses personal clinical experience and modern, evidence-based medical science data at the same time and never independently.
Without taking into account personal experience and specifics, it is clear only to focus on the data of evidence-based Medicin

Fig. 2.evidence-based" Triad " medicine can be the cause of errors in the conduct of a particular patient's patient. In addition, the focus on personal experience leads to the fact that the patient stops receiving modern and effective treatment, which also harms his health.
The implementation and competent use of the principles of evidence-based medicine has a number of objective advantages (fig. 3).
A properly trained doctor in accordance with modern qualification characteristics is obliged, firstly, to be able to distinguish evidence-based information from descriptive information or advertising information. Secondly, he should strive to use only medical interventions with a good evidence base in his daily practice.
These tasks cannot be solved without knowing the algorithm for searching for quality medical information, as well as its subsequent skills
extrapolation in relation to a specific clinical case (fig. 4).

Fig. 3. objectives of evidence-based medicine

Fig. 4. stages of search and application of scientifically based information. At the same time, the last two points are considered the most difficult to implement
Thus, the success of this search will depend on the doctor's ability to clearly formulate the problem in which he seeks to find it. In addition, the identification of the most valuable data is impossible without access to modern sources of medical information, leading journals and electronic databases. Fortunately, there is an easy way. Clinical recommendations created by professional associations to inform the most important trends in World medicine are designed to significantly reduce search time and help practicing physicians.

4. illustrative material: presentation (15 slides are attached)
5.literature: see Appendix 1.
6. Control questions (feedback):
1. What does the DM methodology cover?
2. What are the principles of DM?
3. what features of the basic principles of DM can you name?

1. Topic # 3: Hierarchy of evidence. Proof pyramid. Degrees of validity (ABCD).
2. purpose: to characterize the evidence-based hierarchy of Clinical Trials, their role in medical decision-making. Introduction to Pyramid evidence.
3.lecture theses: after studying the main research designs, it is important to determine what argumentative power each of them has. For this, a hierarchy of evidence from clinical trials was proposed in the early 1990s[85]. At this stage, the study is divided into 4 classes, which are denoted by Roman numerals (I, II, III, IV) or Latin letters (A, B, C, D). According to this classification, the quality of the clinical study (and, accordingly, the evidence) increases with a decrease in the serial number of the category. T. E. A study that belongs to the category I (A), and the least proofreader belongs to the Category IV (D). Below is a description of each class:
Class I (A) (level): data obtained during large double-blind placebo-controlled studies, as well as meta-analysis of several randomized controlled studies
Class II (B) (level): randomized and controlled studies in which statistical data were built on a small number of patients
Class III (C) (level): nandomized clinical trials in a limited number of patients
Class IV (D) (level): development of a consensus by a group of experts on a particular issue
Later, a different classification of the evidence from the clinical trials presented below was proposed. There, clinical trials are divided into 5 Classes(1, 2, 3, 4, 5). Similar to the previous classification, where the quality of the study increases with a decrease in the serial number (the most reasoned – 1, and the least – 5). Each class is divided into two subclasses (a, b), where subclass "b" corresponds to a clinical study, and subclass "A" corresponds to a systematic review (or series) of several such studies. At the same time, 3a has a greater argument than 3B: because a systematic review is a series of combined studies.
Evidence levels of clinical trials
1 a-RKI systematic review
1 B-RKI (randomized controlled study)
2 a-systematic cohort study
2 B-cohort study
3 a-systematic review requirement
3 B-requirement (study "situation-control")
4-one-time study

5 a-clinical cases series
5 B-clinical case
4. illustrative material: presentation (14 slides are attached)
5.literature: see Appendix 1.
6. Control questions (feedback):
1. What are the features of the argument hierarchy?
2. What does the proof pyramid cover?
3. What are the reliability levels (ABCD)?

1.topic # 4: Medical electronic databases that meet the criteria of validity.
2. purpose: familiarization with medical electronic databases (DB) that meet the criteria for proof.
3. lecture theses:
Currently, the number of different methods of diagnosis and treatment in medicine has increased significantly. The amount of information about the health status of patients, which the doctor needs to remember and process, is constantly growing. In addition, information about the patient's health status is posted in several medical and preventive institutions that provide medical care. All these data make it necessary to integrate them. The ever-increasing volume of processed information complicates its regulation and systematization. Every day at the EPM, many important tasks related to the input, processing and storage of medical information, information flow management are solved. A database is used to process a continuously growing amount of data. For more efficient processing of information on all movements of the patient: descent – diagnosis – treatment-rehabilitation-monitoring. In addition, structured information is easy to work with. Therefore, the central place in medical information systems belongs to databases. A database is a set of data stored according to a data structure that is manipulated according to the rules of data modeling.
Classification of databases
The database can be classified into:
- By the nature of the information stored:
- factographic, various card files;
- documentary, for example archives;
- By the way the data is stored:
- centralized, stored on one computer;
- used in distributed, local and global computer networks;
- According to the structure of data organization:
- Tabular, that is, relational data is available to the user, organized in the form of rectangular tables, and all data operations are included in operations related to these tables;
- hierarchical, in such a DB, records are ordered in a certain sequence, and the search for data can be carried out by gradually "unloading" from stage to stage. By structure, a hierarchical database corresponds to the structure of a hierarchical file system.

Creating a database consists of three stages:
1.the first stage is theoretical-DB design. Determined in the period:
- In what tables will DB be;
- the table structure is determined (from what field, what type and size each table consists));
- primary keys are selected for each table.
2.the second stage is the creation of a structure. At this stage, the structure of the tables is described.
3.the third stage is the introduction of notes. Here the filling of database tables with information is carried out.
A medical database is a voluminous collection of well-structured data in the field of Medicine. The set has unified approaches and methods for processing data in various medical issues.
Most often, mis (medical information systems) include the following DB:
- DB of the insured population, the provision of which is carried out taking into account the state benefits assigned to it;
- personalized medical database on patients with socially significant diseases;
- medical and statistical database of personalized data of medical services, including outpatient, inpatient, emergency and Emergency Medical Care, Dental Care;
- financial and economic information base;
- DB on personnel and material and technical equipment of the EPM;
- pharmacoeconomic database;
- database of regulatory and reference information.
4. illustrative material: presentation (14 slides are attached)
5.literature: see Appendix 1.
6. Control questions (feedback):
1. what medical electronic database do you know?
2. What are the advantages of using medical electronic databases?
3. what criteria do you know to respond to evidence?

1. topic # 5: design of clinical trials: gold standard – randomized control samples (RKI).
2. objective: to study the design of clinical trials. Acquaintance with a randomized controlled trial (RKI).
3. lecture theses:
A clinical study is a scientific study with the participation of people in order to assess the effectiveness and safety of a new drug or expand the indications for the use of a known drug. The classification of clinical trials is the presence of intervention in the usual tactics of conducting a patient, that is, standard procedures for examining and treating a patient. Observational (observational) research is a clinical study in which the researcher collects data by simple observation of events in their natural course, without active intervention. A

non-inventive study is a study in which a drug is prescribed in accordance with the conditions prescribed in the permit for market sale. No other diagnostic or monitoring procedures are used for patients, and epidemiological methods are used to analyze the collected data. An interventional study is a study of new, unregistered drugs, immunobiological substances, medical equipment or a study in which medicines, immunobiological substances, medical equipment are prescribed or applied in a way different from the conditions set out in the attached instructions for use (be it a new indication, a new dose of the drug, a new way of administration, a new way of use or a new category of patients). A randomized clinical trial in which patients are randomly divided by treatment groups (randomization procedure) and have the same chance of receiving a studied or control drug (comparison drug or placebo). A controlled (sometimes synonymous with" comparative") clinical study in which the drug under study, the efficacy and safety of which has not yet been fully studied, is compared with a drug whose efficacy and safety are well known (comparison drug). When conducting parallel studies, test subjects in different groups receive only the drug under study or only a comparison drug / placebo. In cross-examination, each patient receives both of the relative drugs, usually in random order.

4.illustrative material: presentation (10 slides are attached).

5.literature: see Appendix 1.

6. Control questions (feedback):

1. according to what characteristics are the types of research divided?
2. What Research Design Do you know?
3. what type of research design is used to compare drug activity?

№	**Name**	**Link**
1	Electronic Library	http://lib.ukma.kz
2	Electronic catalog	http://10.10.202.52 http://89.218.155.74
3	- For internal users	http://rmebrk.kz/
4	- For external users	http://www.studmedlib/ru

5	Republican Interuniversity Electronic Library	https://online.zakon.kz/Medicine
6	Electronic Library of Medical University" student advisor"	https://zan.kz
7	Information system "paragraph"Department " Medicine"	https://elibrary/ru/
8	Electronic source of Legal Information" Law"	http://www.booksmed.com
9	Scientific Electronic Library	http://apps.webofknowledge.com
10	Electronic Library"BooksMed"	https://www.sciencedirect.com
11	«Web of science» (Thomson Reuters)	www.scopus.com
12	«Science Direct» (Elsevier)	https://www.ncbi.nlm.nih.gov/pubmed