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ROLE AND SIGNIFICANCE OF MATHEMATICAL STATISTICS IN MEDICINE

Bahramov Rustam Rakhmatullaevich
Assistant Teacher of Samarkand State Medical University

Khatamov Akbarshokh Khatamovich

Khudoyberdiyev Khudoyshukur Eshkabil o'g'li

Khayitmurotov Samandar Bakhriddin o'g'li
Student of Samarkand State Medical University
Samarkand, Uzbekistan

ANNOTATION
The article covers the issues of mathematical analysis, the theory of sets, graphs, sequences and series, as well as the theory of probability and mathematical statistics in medicine. In medicine, medical data is statistically analyzed using mathematical statistics and probability theory.

Keywords: Mathematical statistics, randomization, placebo, medicine.

INTRODUCTION

Today, mathematical statistics is one of the leading disciplines in medicine. In medicine, mathematics certainly helps in the analysis of medical data and finding solutions, with the help of mathematical methods, modern methods of diagnosis and treatment with high accuracy appear. In medicine, the concept of evidence-based medicine is currently actively developing. These clinical trials provide data on the safety and efficacy of data and suggest prioritization of treatments. Among these, clinical randomized placebo-controlled trials have the highest level of certainty. Randomization means the random selection and random allocation of patients to treatment groups in clinical trials conducted in order to reduce uncertainty, error and increase the reliability of the results; thus, randomized trials are studies in which patients are assigned to treatment groups based on randomization. A more precise definition of randomization is probability sampling or random sampling. For example, it is said that all outpatient medical records in a family clinic are selected randomly from them. We have already mentioned the concept of placebo above, a placebo is a drug that is similar in structure, smell and taste, but does not have the same effect as a special drug. This helps highlight the specific effect of the drug.

Patients given placebo had postoperative pain in one third. When patients with high arterial blood pressure were injected with normal physiological fluid as a hypotonic drug, their AD actually decreased by several units. Researchers are more interested in determining specific efficacy than practitioners and accept placebo efficacy as the basis for measuring specific efficacy.

In addition to clinical research, methods of mathematical statistics are widely used in other types of medicine, because any research must be systematic and consist of experimental results. Otherwise, the data may be inaccurate. Tasks of mathematical statistics in planning research activities: ensuring the representativeness of the sample of the entire general population (in terms of structure and number); correct the data to eliminate and act on possible sources of systematic error; characteristics of the analyzed data and the choice of appropriate methods of information processing. Conducting any scientific research, including medical research, must begin with the identification of the main stages of work. This allows you to determine the required amount of work at each stage and establish the results, the receipt of which will allow you to move on to the next stage. Any medical and statistical research consists of the following stages.

1. Determining the goals and objectives of the study based on a working hypothesis or hypothesis, drawing up a plan and research program.
2. Organizing and conducting the collection of the necessary information, grouping the materials received.
3. Statistical data processing.
4. Analysis of the obtained results, conclusions.

When the systolic blood pressure of 10 athletes who came to therapy was measured, the following results were obtained: 110 115 110 120 125 120 100 115 130 120. We determine the systolic blood pressure after physical exercise according to mathematical statistics.

Arithmetic mean index of variational series is determined by the following formula.

$$M = \frac{\sum_{i=1}^{N} v_i}{N}$$

Here v_i -are variants (each number is a variant), N-is the number of variants (observations).

M =(110+115+110+120+125+120+100+115+130+120)/10 = 1165/10 = 116.5

The formula for determining the mean squared deviation is determined by the following formula.

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$$G = \sqrt{\frac{\sum_{i=1}^{n} d_i^2}{n-1}}$$

$d_i = v_i - M$ The difference from the average arithmetic index of each option.

v	110	115	110	120	125	120	100	115	130	120
d	-6,5	-1,5	-6,5	3,5	8,5	3,5	-16,5	-1,5	13,5	3,5
d^2	42,25	2,25	42,25	12,25	72,25	12,25	272,25	2,25	182,25	12,25

$\sum d^2 = 652.5$ **G**=$\sqrt{652,5/9}$=8,51

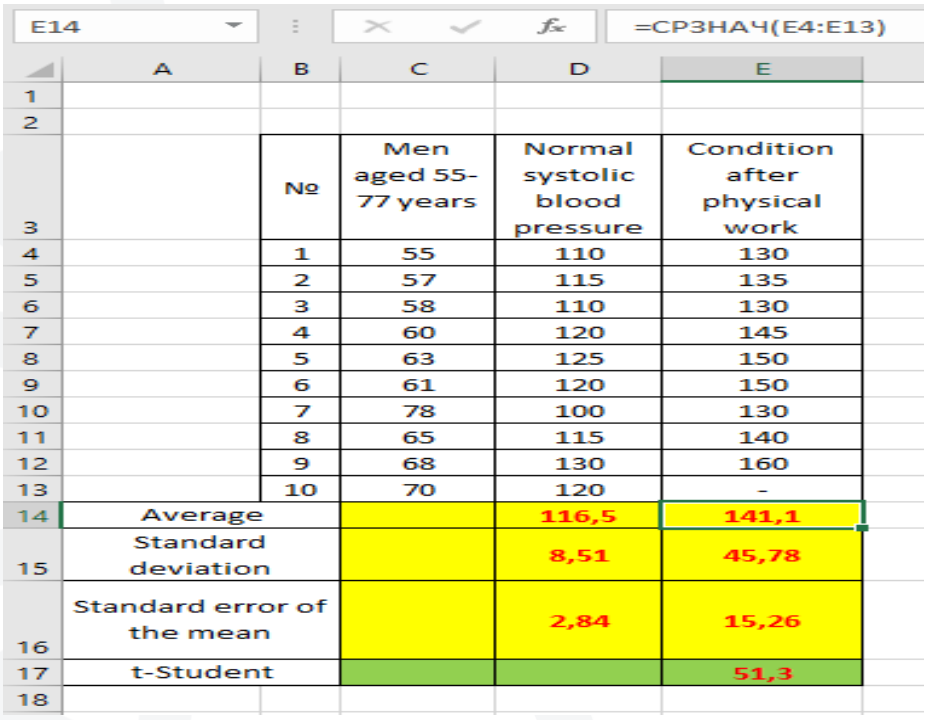
$m = \frac{G}{\sqrt{n-1}}$, when n = less than 30

In our example, n = less than 30 So: $m = \frac{8,51}{\sqrt{9}} = \frac{8,51}{3} = 2,84$

The empirical value of the t-Student test is determined using the following formula:

$t = (M_2 - M_1)/S$ here $S = \sqrt{\frac{G_1+G_2}{N_1+N_2-2} * \frac{N_1+N_2}{N_1*N_2}}$,

$S = \sqrt{\frac{8,51+10,22}{10+9-2} * \frac{10+9}{10*9}}$, S=0,48 $t = (141,1 - 116,5)/0,48$ t=51,3



	A	B	C	D	E
1					
2					
3		№	Men aged 55-77 years	Normal systolic blood pressure	Condition after physical work
4		1	55	110	130
5		2	57	115	135
6		3	58	110	130
7		4	60	120	145
8		5	63	125	150
9		6	61	120	150
10		7	78	100	130
11		8	65	115	140
12		9	68	130	160
13		10	70	120	-
14	Average			116,5	141,1
15	Standard deviation			8,51	45,78
16	Standard error of the mean			2,84	15,26
17	t-Student				51,3
18					

The first stage is the main one, since the correct choice of the goal determines the entire direction of further research and justifies the costs and time spent on achieving the desired goal.

The goal of most medical research is to determine the impact of various controllable factors on human health. A controllable factor refers to various internal or external causes that affect the health of the population and are measured by research. Factors may include living conditions, diet, concentration of harmful substances, electromagnetic radiation, medicinal substances, etc.

CONCLUSION

So, in medicine, it consists of compiling mathematical statistics of medical data, analyzing and processing data, evaluating the reliability of data based on probability theory based on the results obtained, comparing and predicting modern methods of treatment.

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