RESEARCH OF INFLUENCE OF MEDICATION PREPARATIONS
ON THE PROCESS OF RENEWAL OF THE BROKEN EQUILIBRIUM
OF MAN ORGANISM ON THE DOCTOR OF PHYTOTHERAPY WORKSTATION

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Abstract: In the given work by authors new approach to the exposure of degree of influencing of medications of vegetable origin in a time of renewal of broken equilibrium of man organism is offered. During realization of the given approach it is suggested to use the mathematical vehicle of.

Keywords: Imitation design, Markov processes, phitotherapy

ACM Classification Keywords: Decision Making

Introduction

During last years enhanceable interest is noted to the alternative methods of medical treatment of man and, especially, to phytotherapy. It is method of medical treatment of man organism by medications of vegetable origin. It can be used as independent or additional type of medical treatment and prophylaxis of different diseases and also rehabilitation of patients with the chronic diseases. A new coil in development of this type of medical treatment demanded the revision of attitude toward one, and also developments of modern methods of leadthrough and estimation of its efficiency. The phytotherapy foresees setting of medical plants. It allows individualizing the process of medical treatment taking into account classification of illnesses, their etiopathogenetic essence, and also to get most and as much possible rapid clinical effect with the minimum of sides actions, that is not always arrived at the use of synthetic medicinal preparations [Самура *2003*].

One of important stages of prophylaxis and medical treatment of different diseases is the ground of expedience of application of one or another type of therapy. As a result the real research directed on the exposure of degree of influencing of medications of vegetable origin on a time of renewal of the broken homoeostasis of man organism is of great scientific and practical interest.

Methods and materials

For research of influencing of synthetic and phytotherapeutic preparations on the process of renewal of the broken equilibrium of man organism the two groups of patients were inspected. Each of which was broken on sub-groups depending on the initial state of patients. The division on sub-groups was conducted according to general classification of the state of man organism [3]:

E1 as the conditionally healthy;

E2 as the initial changes (i.e. the such boundary state of organism, when it isn't impossible to talk about the presence of declining or some concrete disease, but the changes in the usual healthy state are already noted);

E3 as the easy degree of deviation from a standard or easy stage of disease;

E4 as the middle degree of deviation from a standard or middle stage of disease;

E5 as the heavy degree of deviation from a standard or heavy stage of disease;

E6 as the extremely heavy degree of deviation from a standard or extremely heavy stage of disease;

E7 as the fatal outcome.

At primary examination the all inspected were certain in some sub-group from initial five, namely sub-group with the states of E2 – E6. In other words, on the inspection conditionally healthy or dying people did not act. However the medical treatment was conducted to the moment of transition of patient in the state of E1 – conditionally healthy. Also in one group the accident of fatal outcome was noted at providing of medical treatment. In other words, the state of E7 was not initial, but passage is possible to E7. The first group was made by 150 patients who in the moment of primary examination passed medical treatment only by synthetic preparations. The second group consists of 150 patients. This group was conducted medical treatment by vegetable medications. In the depending from state on weight, patients together with the offered medical treatment by vegetable medications adopted synthetic preparations. The dynamic supervision after patients included the clinical, laboratory-biochemical and bacteriologic examinations. Control examinations were conducted one time per a month. On every examination concerned current value of the state of organism. From the chosen current status, the adjustment or establishment of diagnostic and medical strategy was carried out.

For the ground of application efficiency of vegetable medications at renewal of the broken equilibrium of organism the modeling of influence of synthetic and phytotherapeutic preparations on the process of renewal of homoeostasis of man was conducted. On the basis of data about probability of that a patient is in one of five initial states and also data about probability of change of its state on neighboring to the moment of next examination by mathematical one vehicle of theory of Markov processes the numeral values of probabilities of that a patient on a next step will be is in each of seven states were received. Values of probabilities of that a patient in the moment of current examination is in one of seven states, came forward as basic data for the calculation of probability of the state of patient on the next step of design [Медик 2007, Гармоткина 2005].

Human organism as most complex organized biological systems can be represented by the difficult system with the great number of entrances and outputs and this system in different moments of time can be in one k-th of the N possible distinguished standings.

There is also discrete kind of temporal intervals between the separate steps (by stages) of process of diagnostics and treatment.

As is generally known, the system is determined if the vector of probabilities of the initial state of the system $P_k(0)$, and also conditional probabilities of transitions P_{ki} from current state k into the i-th state during f chosen interval of time Δt, i.e. during one step, are known.

It means that if present probability of a patient was on start point in one of five initial states, and also probability of change of patient's states till the next checking point are known, it is possible to calculate probabilities of being of the system at any k-th state on a next step, i.e. at the moment of time $t + \Delta t$ [Токмачев 2003].

Mathematically this probability will be determined on the formula of complete probability:

$$P_k(t + \Delta t) = P_1(t) \cdot P_{1k} + P_2(t) \cdot P_{2k} + P_3(t) \cdot P_{3k} + P_4(t) \cdot P_{4k} + P_5(t) \cdot P_{5k} + P_6(t) \cdot P_{6k} + P_7(t) \cdot P_{7k}$$

Thus also there is the requirement, that the sum of probabilities of all states is equal 1.

Values of probabilities of a patient in the moment of current checking point is in one of seven states, base as beginning data for the calculation of probability of the patient's state on a next step of imitation.

The results of imitation in form of changes dependences of these probabilities from the initial patient's state in a sub-group and from the got type of treatment are shown on the fig. 1 – 5.
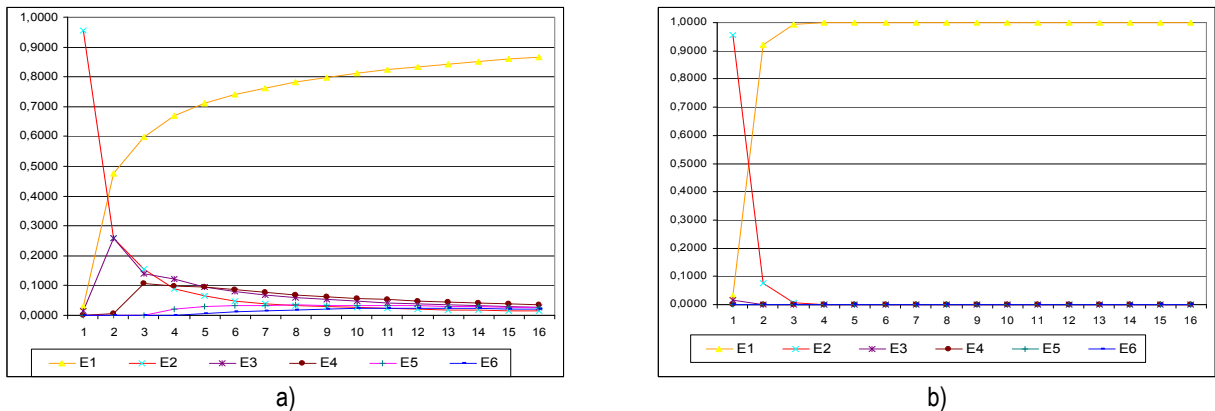
Fig.1. Probability of presence of the state of E1–E7 in the first (a) and second (b) groups for sub-groups with the initial state of E2
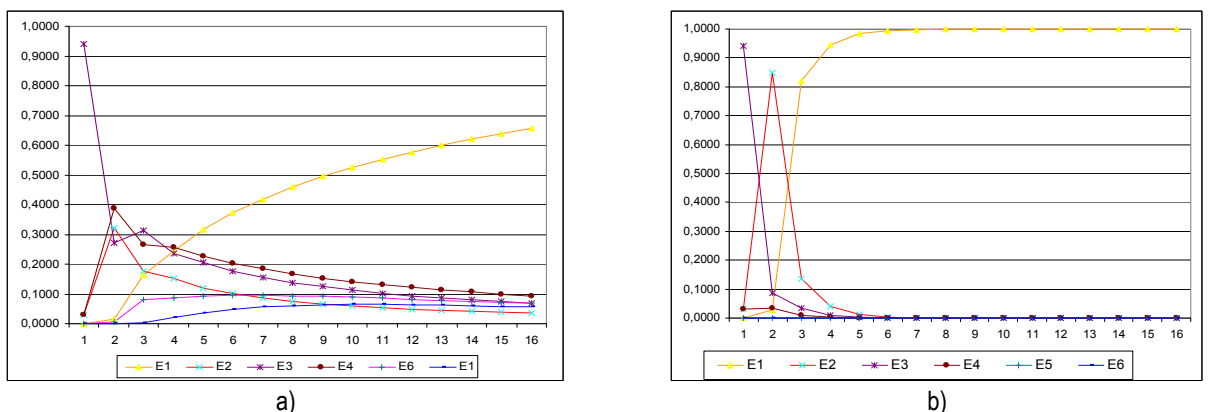

Fig.2 Probabilities of presence of the state of E1–E7 in the first (a) and second (b) groups for sub-groups with the initial state of E3
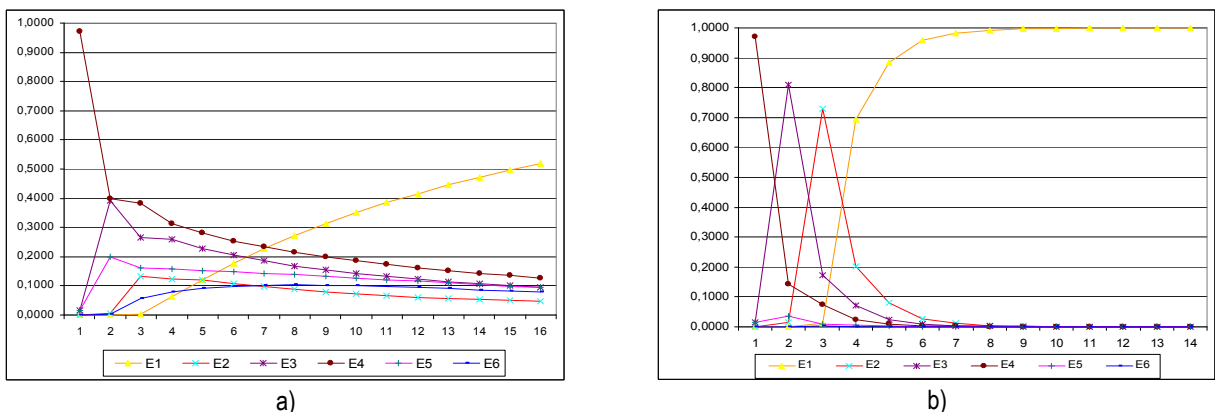

Fig.3 Probabilities of presence of the state of E1–E7 in the first (a) and second (b) groups for sub-groups with the initial state of E4
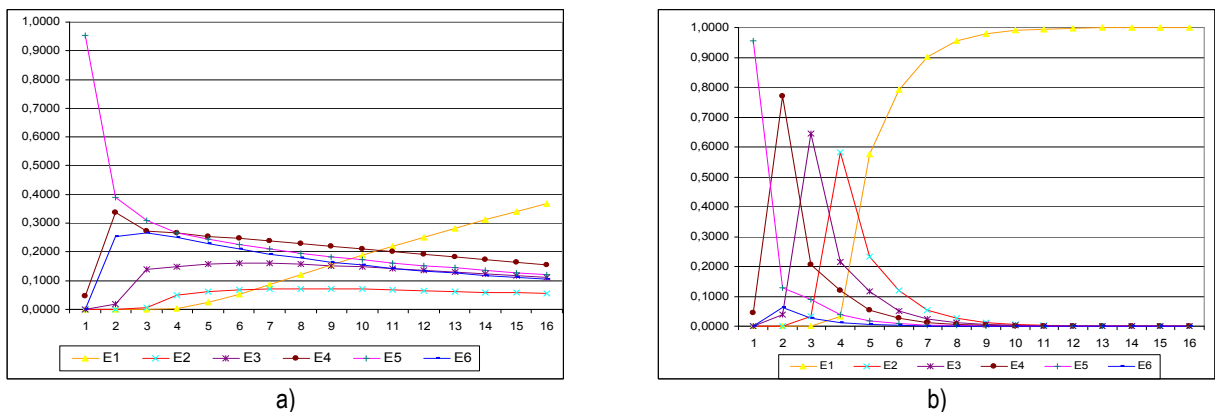

Fig.4 Probabilities of presence of the state of E1–E7 in the first (a) and second (b) groups for sub-groups with the initial state of E5

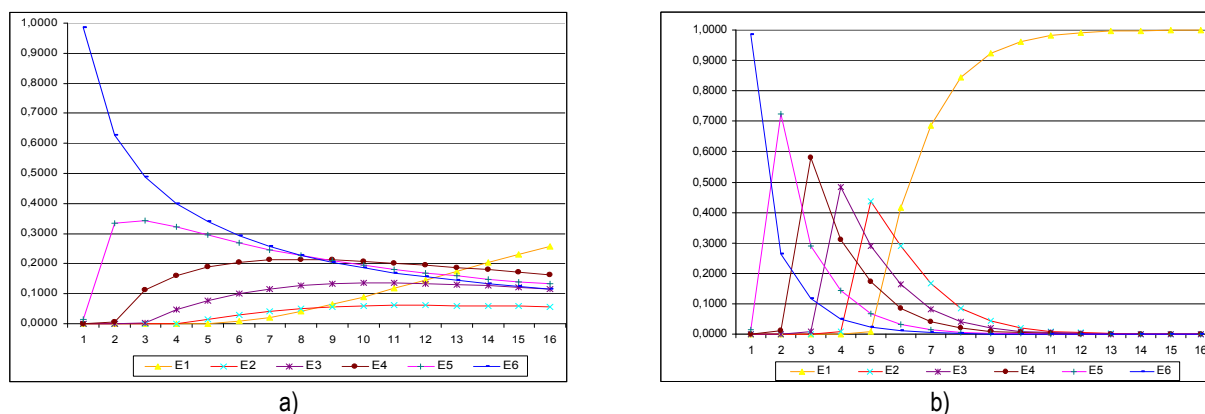a)   b)

Fig.5 Probability of presence of the state of E1–E7 in the first (a) and second (b) groups for sub-groups with the initial state of E6

Analysis and discussion

General review of the received graphs a) from every figure shows on the increase of quantity of steps in medical treatment of patients only by synthetic preparations from the first group, at condition that a patient came on the first examination with more heavy form of disease. Similar situation and with the graphs on figures б) for the second group of patients which got phytotherapeutic preparations. Thus, to talk about a critical moment in the dynamics of the state of patient it is possible on a step, when probability of the «conditionally healthy» state higher than probabilities of all the other states. For example, on Fig.2a this step is the number 5, and on a Fig. 4a this step is the number 12. The number of such step shows minimum duration of medical treatment for every group of patients.

Pair analysis of the graphs of probabilities of the states for two groups of patients at identical initial states of patients shows that minimum duration of medical treatment at patients from the second group shorter already since a Fig 2. I.e. even at presence of easy stage of disease: for the initial state of E3 difference in minimum duration of medical treatment between groups is equal 2 steps. I.e. 2 months, at the initial state of middle degree of declining is difference in 4 steps or in 4 months, and at the heavy degree of declining is already in 9 steps or in 9 months. That indicates on efficiency of the use of phytotherapeutic preparations.

Similarly note should be taken, that for the second group of patients the minimum duration of medical treatment gives more high absolute values of probabilities of «conditionally healthy» state. So, at the initial state of E3 the probability of the state of E1 in the first group at fifth control examination is 31%, and for the second group on the third control examination is 82%. Similar situation for the initial state of E5: for the first group of the state of E1 achieves the value 22% over a year, and for the second group is 58% over 4 months of medical treatment with the phytotherapeutic preparations application.

Fact that for all the time of treatment of patients from first group with, for example, the middle degree of deviation (fig. 3a) till the moment into which probability of state «de been ease healthy» becomes maximal from all possible states, most value of probability at state E4, i.e. of the initial state, is very interesting. In contrary to the second group of patients (рис.3b) already on the second step of treatment with using of phytotherapeutic facilities, probability of more easy degree of deviations becomes most. This tendency is saved on every subsequent step up to a «critical moment», when from all states maximally probably becomes «de been ease healthy».

That is why all graphs of dependences of probability of the states for the second group have a peaks kind, but the graphs of probabilities for the first group of patients are declivous and in the separate places of probability of the «unhealthy» states, i.e. of all except for the state E1, even increase during one-two the steps, for example, steps 2-4 on fig.3a, steps 2-5 on fig.4a and steps 2-6 on fig.5a.

It marks that especially during these stages the results of treatment are extremely unsteady.

Comparison of the models and actual results of states probabilities during renewal of equilibrium disturbance of human organism with using phytotherapeutic facilities showed that exactness of their coincidence on the interval t=3 made 91% (table1) and 86% at treatment by synthetic facilities.

Conclusion

The increased interest to the use of phytomedications in treatment requires additional researches of their efficiency. The results of the conducted research allow getting numeral confirmation of effective application of phytotherapy facilities. The comparative analysis of numeral results of probabilities of the patient's states showed reduction of duration of treatment, more rapid transition from the grave conditions into lights, and also receipt of more credible, i.e. steady positive changes at renewal of equilibrium disturbance of human organism with the additional use of phytomedications. From other side, as well as all other results of modeling, offered models can be efficiently used on prognostication of results of medical tactic.

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