

SESJA II. EPIDEMIOLOGIA I SPOŁECZNE ASPEKTY RZESISTKOWICY

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USE OF COMPUTERS IN STUDYING THE INCIDENCE OF TRICHOMONIASIS IN POPULATION

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T. vaginalis is deeply discussed not only here but on many other related symposia. The literature on this subject, as we know, is really extensive. Even the number of people working in trichomoniasis either in therapeutic or research fields is considerably high. Actually this is a disease which in uncomplicated cases can be easily treated. These are the facts but, in contradiction with just said, it is still a large percentage of people suffering from this disease. Here we can see a great contradiction between reality and existing possibilities.

The epidemiology, the ways of trichomoniasis transfer, are also well known. The recognition of this disease is also not a problem any more in Czechoslovakia. In order to find out how it is really with the trichomoniasis in the population, we have returned after ten years to one local ambulance in an Eastern Slovakian small town. Ten years ago there were examined 209 females as they visited the gynecologic ambulance. Trichomoniasis was found in 8.6%. After ten years at the same ambulance we have examined with the same procedure 220 females. In spite of the fact that during last ten years the diagnostic methods as well as the health education were improved, new and efficient drugs were introduced, the occurrence of trichomoniasis has increased. After these ten

years trichomoniasis was found in 24.5%. It means that the occurrence of this disease was tripled. These fact led us to an attempt to utilize computer simulations technic to find out the decrease of trichomoniasis occurrence.

Using a computer it is possible to study the dynamics of the infectious diseases development in a big population by probabilistic methods. The high level algorithmic languages as well as appropriate simulation languages are efficient tools for the computer utilization in this respect. We have suggested in our computer simulation no great measures. We were considering the possibilities of influencing trichomoniasis occurrence in a big population by paying careful attention to all naturally examined females for the trichomoniasis occurrence and in all cases of positive finding, providing an intensive treatment to both, to patient as well to her sexual partner.

The simulation was performed on a compartmental model illustrated on Fig. 1. This is a three-compartmental model. One, denoted by SEX-ACTIVE, is representing the sexual active females not suffering from trichomoniasis. The next one, denoted by *T. vaginalis*, is representing

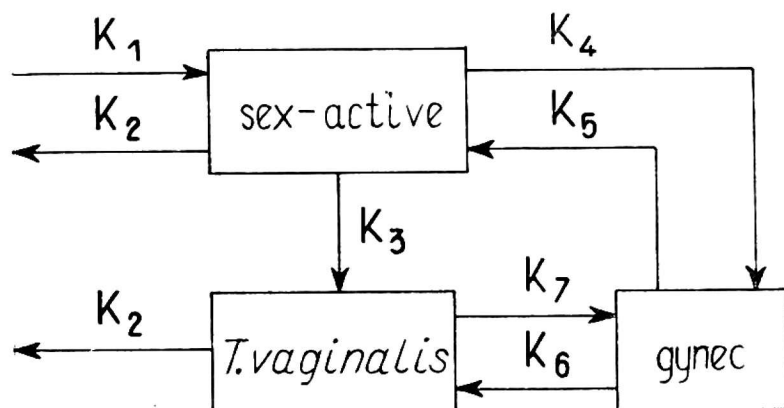


Fig. 1. Model of studying the incidence of Trichomoniasis in population
Ryc. 1. Model zapadalności na rzesistkowicę w populacji

just the opposite health condition, the third one, denoted by GYNEC., is representing the part of the considered population undergoing the gynecological examination. The oriented connections of these compartments with each other as well as with the model environment have the following meaning:

- K_1 — females in-flow to a sexual active stage,
- K_2 — females out-flow from the sexual active stage,
- K_3 — undetected trichomoniasis occurrence,
- K_4 — females approaching the gynecological ambulance,
- K_5 — females with negative trichomoniasis findings,
- K_6 — females with positive trichomoniasis findings,
- K_7 — females approaching the gynecological ambulance.

As the programming tool for the simulation on this model, the simulation language GPSS III (General Purpose System Simulation) was used. The input data, considering the population of sexually active Slovak females, were obtained from the Ministry of Health. On the basis of our previous examination made on representative samples of the considered population we have introduced to the model certain degree of initial trichomoniasis occurrence (approximately the one fourth of the population) as well as the values some of the constants K ($K_3 = 1/6$, $K_4 = 1/3$, $K_5 = 3/4$, $K_6 = 1/4$, $K_7 = 1/4$). The values for the constants K_1 and K_2 were during the simulation developed from the following actual and prognostic numbers of females in the age from 15 to 59 years considered in the model situation: 1967 — 1,282972, 1970 — 1,234600, 1975 — 1,220576, 1980 — 1,280806, 1985 — 1,370047.

TABLE 1

Results of studying the incidence of Trichomoniasis in population during 20 years

TABELA 1

Wyniki badania zapadalności na trichomonadozę w populacji w okresie 20 lat

| Year Rok | Healthy Zdrowych | | Trichomoniasis | | Undetected Niewykry- tych | | Total Razem |
|-------------|---------------------|------|----------------|------|---------------------------------|-----|----------------|
| | No. | (%) | No. | (%) | No. | (%) | |
| 1 | 878 | 72.1 | 326 | 26.8 | 13 | 1.1 | 1217 |
| 2 | 961 | 79.2 | 246 | 20.3 | 6 | 0.5 | 1213 |
| 3 | 1000 | 82.5 | 203 | 16.7 | 9 | 0.7 | 1212 |
| 4 | 1055 | 86.5 | 157 | 12.9 | 7 | 0.6 | 1219 |
| 5 | 1080 | 88.7 | 132 | 10.8 | 6 | 0.5 | 1218 |
| 6 | 1104 | 90.6 | 102 | 8.4 | 13 | 1.1 | 1219 |
| 7 | 1124 | 92.5 | 84 | 6.9 | 7 | 0.6 | 1215 |
| 8 | 1142 | 93.8 | 65 | 5.3 | 10 | 0.8 | 1217 |
| 9 | 1159 | 94.8 | 50 | 4.1 | 13 | 1.1 | 1222 |
| 10 | 1173 | 95.8 | 41 | 3.3 | 10 | 0.8 | 1224 |
| 11 | 1182 | 96.5 | 30 | 2.4 | 13 | 1.1 | 1225 |
| 12 | 1181 | 97.3 | 25 | 2.1 | 8 | 0.7 | 1214 |
| 13 | 1194 | 97.7 | 22 | 1.8 | 6 | 0.5 | 1222 |
| 14 | 1200 | 97.9 | 19 | 1.5 | 7 | 0.6 | 1226 |
| 15 | 1200 | 98.0 | 13 | 1.1 | 12 | 1.0 | 1225 |
| 16 | 1203 | 98.3 | 12 | 1.0 | 9 | 0.7 | 1224 |
| 17 | 1208 | 98.4 | 13 | 1.1 | 7 | 0.6 | 1228 |
| 18 | 1204 | 98.4 | 9 | 0.7 | 11 | 0.9 | 1224 |
| 19 | 1208 | 98.5 | 8 | 0.6 | 10 | 0.8 | 1226 |
| 20 | 1208 | 98.7 | 5 | 0.4 | 11 | 0.9 | 1224 |

In the time being there is in the Slovak Socialist Republic approximately 1,100,000 sexually active females. According to the Ministry of Health in all Slovak gynecological and obstetrical facilities there are 400,000 females examined per year. The considered initial level of the trichomoniasis is 26.7% in our model situation.

Let us now introduce a very simple interpretation of the results obtained from a model situation. Table 1 represents the basic data about the number of healthy women in the age of sexual activity, about the number of women suffering from trichomoniasis and about the changes of the trichomoniasis occurrence level, and then about the number of undetected females with trichomoniasis (all absolute figures are in thousands). The total number represents the females population changes in the age of sexual activity. These numbers were obtained under the assumption that one fourth of the sexually active female population is suffering from the trichomoniasis. It means that in initial situation we have to consider approximately 300,000 females. Approximately 400,000 females are yearly gynecologically examined and from this number again the one fourth is having trichomoniasis. Certain number from these women will get cured but the other from the healthy part will get sick or will be re-infected. As we can see it is a loop.

The behaviour of this model we have observed in the time interval of twenty years which is enabled by the chosen simulation language. According to the model the number of females suffering from trichomoniasis would decrease as it is shown in Fig. 2. In an optimal case inten-

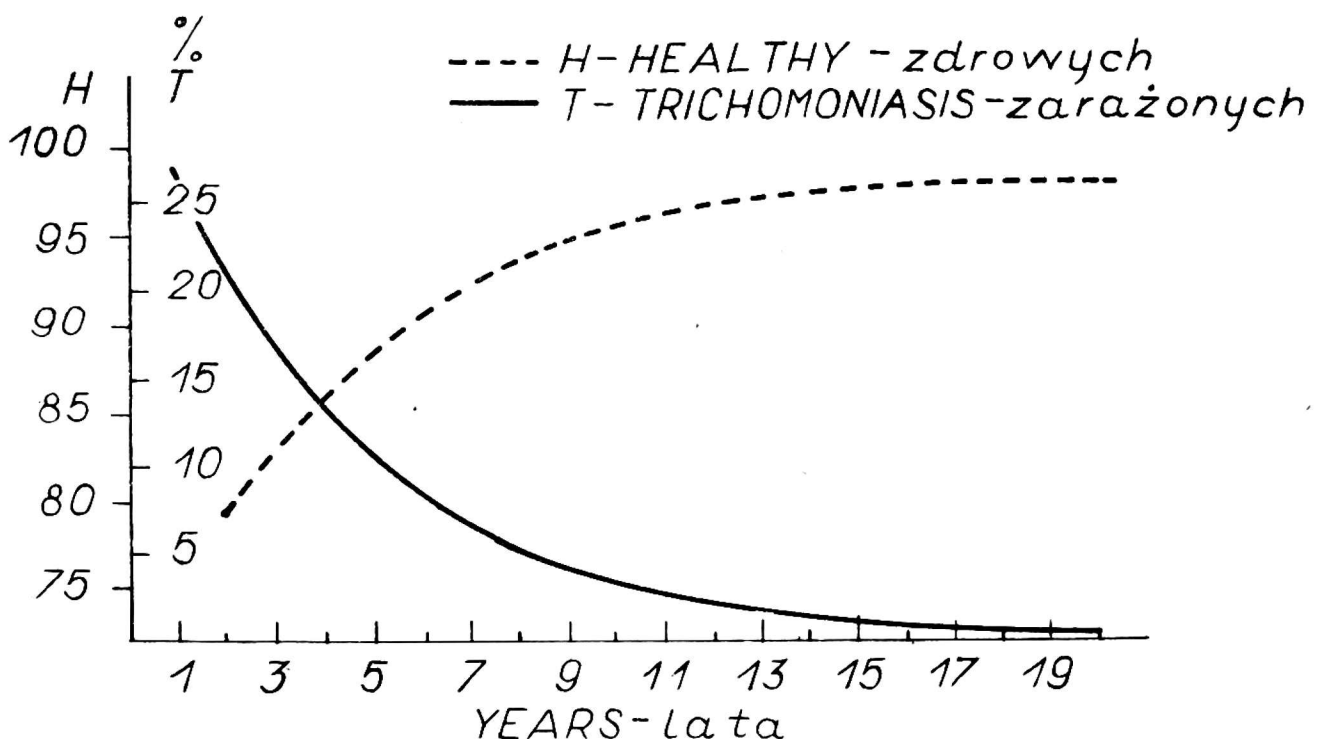


Fig. 2

sive five years lasting effort would yield to 10.8% trichomoniasis decrease. After ten years of such effort it is possible to reach the decrease to 3.3%.

We think that prognostic studies of this character should lead use to proper activity also on the level of international coordination.

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ZASTOSOWANIE KOMPUTERA DO OCENY CZĘSTOTLIWOŚCI RZĘSISTKOWICY W POPULACJI LUDZKIEJ

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Pasożytniczo-weneryczne schorzenie, jakim jest rzęsistkowica, należy do paradoksalnych zjawisk w życiu współczesnego człowieka. Choroba szerzy się głównie poprzez kontakt płciowy, dlatego też częstotliwość jej jest bardzo wysoka i zwiększa się w warunkach swobody seksualnej i nierządu.

Autorzy opracowali model zastosowania techniki komputerowej do obserwacji częstotliwości rzęsistkowicy w danej populacji. Jeżeli w walce z infekcją rzęsistkową u ludzi będzie brana pod uwagę tylko diagnostyka i leczenie, to szansa na znaczne ograniczenie lub likwidację schorzenia będzie bardzo mała. Dlatego też jest rzeczą konieczną poszukiwanie innych, nowych, bardziej skutecznych sposobów ograniczania i zwalczania rzęsistkowicy w populacji ludzkiej.