YOUNG ADULTS AND NUMBER OF SEXUAL PARTNERS IN THE PAST THREE MONTHS, EVALUATIVE INDEX FOR A SEXUALLY ACTIVE LIVE

Suciu O.[1], Vlaicu B.[1,2], Doroftei S.[1], Petrescu C.[1], Fira-Mladinescu C.[1], Putnoky S.[1], Bagiu R.[1], Ursoniu S.[1], Cheptănariu D.[3]

1."Victor Babes" University of Medicine and Pharmacy Timisoara, Romania
2. Institut of Public Health "Prof.Dr. L. Georgescu", Timisoara, Romania
3.Omnisan Polyclinic, Timisoara

REZUMAT

Tânărul trece de la o stare de dependenţă social-economică totală, în care familia şi şcoala îi călăuzeau activitatea şi comportamentul, la o independenţă relativă. În raport cu starea neurohormonală, cât şi cu gradul de influenţă al factorilor de mediu, în special cel educaţional, familial şi şcolar, acomodarea la noua situaţie, cât şi trecerea prin această etapă a vieţii se fac mai mult sau mai puţin zgomotos, încadrând pasiunea şi emoţia între normal şi anormal. Studiul a fost efectuat pe un lot reprezentativ al tinerilor din instituţiile de învăţământ superior din judeţul Timiş, zonele urbane, şi a inclus un total de 2076 de tineri, (1296) fete 62,49% şi 37,51% (778) băieţi. Rezultatele arată că majoritatea baieţilor cu viaţa sexuală, 34% (256), indică cinci sau mai mulţi parteneri până în prezent, 7,8% (59) spun că au avut contact sexual cu patru persoane, 11,7% (88) cu trei persoane, 13,7% (103), cu două persoane, iar 16,4% (123) dintre băieţiindică un singur partener de până în prezent. Un procent de 15,9% (121) de băieţi şi 11,7% (150) de fete care au întreţinut deja o relaţie sexuală, nu au avut un contact sexual in ultimele trei luni. În schimb, 67,1% (510) dintre băieţi şi 64,5% (828) dintre fete care au menţinut deja o relaţie sexuală, sunt activi sexual. Deşi cei mai mulţi tineri cred că sexul este egal cu dragostea, în special băieţii cred că sexul nu este expresia ultimă a angajamentului trecut, ci doar o activitate casual pentru a minimiza riscurile şi consecinţele grave.

Cuvinte cheie: *tineri, comportament, sex, parteneri*

ABSTRACT

Young move from a state of total social and economic dependency in the family and guiding his school work and behavior, the relative independence. In comparison with neurohormonal status and the degree of influence of environmental factors, especially education, family and school, to accommodate the new situation, and pass through this stage of life are more or less noisy, framing passion and between normal and abnormal emotion. The study population was performed on a representative of young people from higher

education institutions in Timis county, urban areas; and it included a total of 2076 young people, 62.49% (1296) girls and 37.51% (778) boys. The results show that most boys with sexual life, 34% (256), indicating five or more partners to date, 7.8% (59) say they had sexual contact with four people, 11.7% (88) with three persons, 13.7% (103) with two persons, 16.4% (123) indicates a single partner of the boys so far. A percentage of 15.9% (121) of boys and 11.7% (150) of girls who have already maintained a sexual relationship, hasn't a intercourse in the last three months. In return, 67.1% (510) of boys and 64.5% (828) of girls who have already maintained a sexual relationship, are sexually active. Although most young people believe that sex equals love, especially boys believe that sex is not the ultimate expression of the last commitment, it's just a casual activity and minimize the risks and serious consequences.

Keywords: *young, behavior, sex, partners*

INTRODUCTION

Postpubertal sexual freedom would seem to be natural, however in reality this time sexual life still hides many risks: venereal diseases, AIDS, abortion, or unwanted child born outside marriage, family conflict [1,2].

From childhood, children watch television shows and films sexappeal site emphasizes that it is a personal quality that people need to fully develop [3,4]. Sexual content is broadcast regularly on the market for teenagers and young adults, affecting sexual activity and conceptions about sex [5].

The Internet offers almost unlimited access to adolescents about sex and a lot of people wanting to talk to them about sex [6,7]. Young people could feel secure because they can remain anonymous, while looking at information about sex [8,9]. Profiteers from the sex know this and manipulate young people to have relationships online and then convince them to meet [10].

Although most young people believe that sex equals love, especially boys believe that sex is not the ultimate expression of the last commitment, it's just a casual activity and minimize the risks and serious consequences [11-13].

METHODOLOGY

The Study Population was performed on a representative of young people from higher education institutions in Timis county, urban areas; and it included a total of 2076 young people, 62.49% (1296) girls and 37.51% (778) boys.

The work method was the transversal populational study, by group and anonimous use of the CORT 2004 questionnaire for investigating some health risk behaviours in young subjects, as concieved by a CNCSIS accredited research, based upon the adaptation of some international questionnaires (ESPAD, YRBSS) to Romanian realities, during the period 2003 – 2005.

RESULTS AND DISCUSSIONS

The number of sexual partners

Most boys with sexual life, 34% (256), shows five or more partners to date, 7.8% (59) say they had sexual contact with four people, 11.7% (88) by three, 13.7% (103) with two persons and 16.4% (123) indicates a single partner of the boys so far. Most girls, 35.4% (452) mentions only one sexual partner, 17.3% (221) say they had sexual contact with two persons, 9% (115) by three, 5.9% (75) with four persons and 8.4% (107) with five or more partners

before. It noted an inverse to the two sexes in terms of number of sexual partners (Table 1, Figure 1).

Table 1. Distribution of students by number of sexual partners by age

Answers	Sex				Total	
	F		M			
	No.	Weighted percent	No.	Weighted percent	No.	Weighted percent
One person	452	35.4	123	16.4	575	28.3
2 people	221	17.3	103	13.7	324	16.0
3 people	115	9.0	88	11.7	203	10.0
4 people	75	5.9	59	7.8	134	6.6
5 or more persons	107	8.4	256	34	363	17.9
Never had sexual relations	307	24.0	123	16.4	430	21.2
Total	1277	100	752	100	2029	100

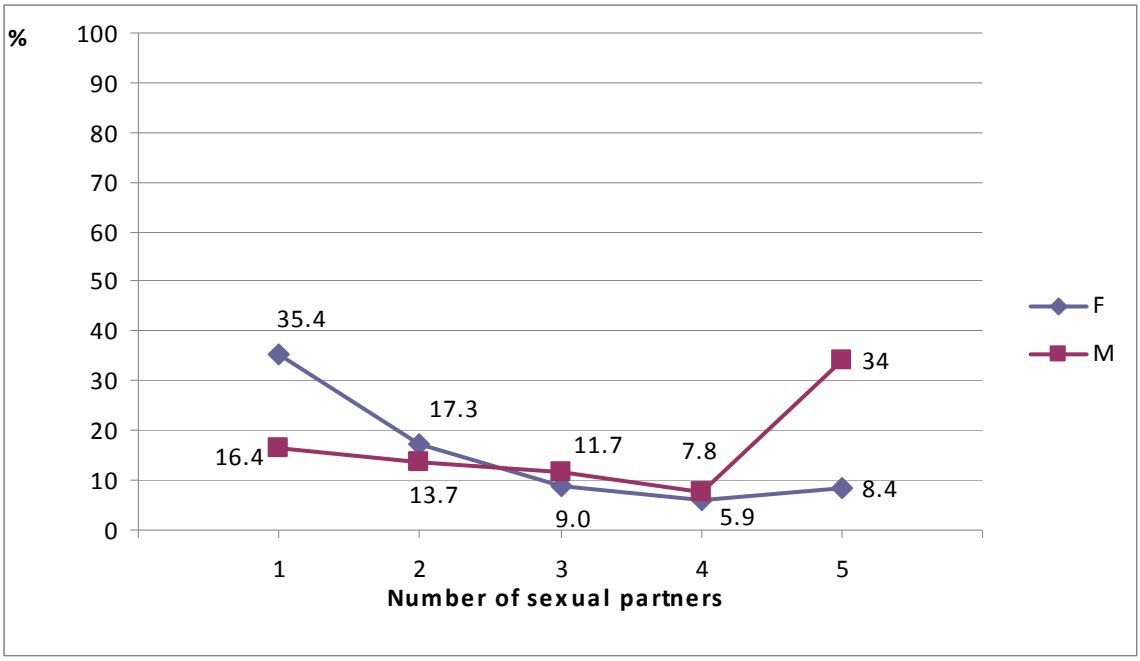

Figure 1. Percentage distribution of students having sex sex, according to the number of sexual partners

In the 18 years age group was most commonly reported one sexual partner, 50% (3). Maximum number of reported sexual partners was five or more persons, 16.7% (1).
At 19 most commonly reported one sexual partner, 25.6% (71). Maximum number of reported sexual partners was five or more persons, 14.1% (39).
At 20 years the most frequently reported a sexual partner, 30.5% (148). Maximum number of reported sexual partners was five or more persons, 14.2% (69).
At 21 years was the most frequently reported a sexual partner, 29.3% (162). Maximum number of reported sexual partners was five or more persons, 16.1% (89).

At 22 years was the most frequently reported a sexual partner, 28.3% (115). Maximum number of reported sexual partners was five or more persons, 20.6% (84).

At 23 years was the most frequently reported a sexual partner, 29.3% (44). Maximum number of reported sexual partners was five or more persons, 22.7% (34).

At 24 years were most frequently reported five or more sexual partners, 29% (27). At 25 years were most frequently reported five or more sexual partners, 33.9% (20) (Table 2).

Table 2. Distribution of students by number of sexual partners, by age

Answers	Age (years)								Total
	18	19	20	21	22	23	24	25	
	No. %	No. %	No. %	No. %	No. %	No. %	No. %	No. %	No. %
One person	3 50.0	71 25.6	148 30.5	162 29.3	115 28.3	44 29.3	17 18.3	16 27.1	576 28.4
2 people	0 0.0	42 15.2	68 14.0	102 18.4	76 18.7	20 13.3	10 10.8	6 10.2	324 16.0
3 people	0 0.0	29 10.5	41 8.4	59 10.7	41 10.1	13 8.7	16 17.2	5 8.5	204 10.0
4 people	0 0.0	11 4.0	21 4.3	40 7.2	34 8.4	13 8.7	11 11.8	4 6.8	134 6.6
5 or more persons	1 16.7	39 14.1	69 14.2	89 16.1	84 20.6	34 22.7	27 29.0	20 33.9	363 17.9
Never had sexual relations	2 33,3	85 30.7	139 28.6	101 18.3	57 14.0	26 17.3	12 12.9	8 13.6	430 21.2
Total	6 100	277 100	486 100	553 100	407 100	150 100	93 100	59 100	2031 100

Non-responses: 45

The number of sexual partners in the last three months

A percentage of 15.9% (121) of boys and 11.7% (150) of girls who have already maintained a sexual relationship, have not a intercourse in the last three months. In return, 67.1% (510) of boys and 64.5% (828) of girls who have already maintained a sexual relationship, are sexually active.

Among boys, most, 48.4% (368), indicating a single partner in the last three months, 8.4% (64) two partners, 4.1% (31) listed three partners, 2.4% (18) four partners, 3.8% (29) says there are five or more partners in the last three months.

Most girls, 58.8% (755) mentions only one sexual partner in the last three months, 4.2% (54) shows two partners, 0.8% (10) three partners, 0.1% (1) had four partners, 0.6% (8) indicates five or more partners (Table 3, Figure 2).

Table 3. Distribution of students by number of sexual partners in last 3 months

Answers	Sex				Total	
	F		M			
	No.	Weighted percent	No.	Weighted percent	No.	Weighted percent
One person	755	58.8	368	48.4	1123	55.0
2 people	54	4.2	64	8.4	118	5.8
3 people	10	0.8	31	4.1	41	2.0
4 people	1	0.1	18	2.4	19	0.9
5 or more persons	8	0.6	29	3.8	37	1.8
With nobody in the last 3 months	150	11.7	121	15.9	271	13.3
They hasn' t sexual relations before	305	23.8	129	17.0	434	21.2
Total	1283	100	760	100	2043	100

Non-responses: 33

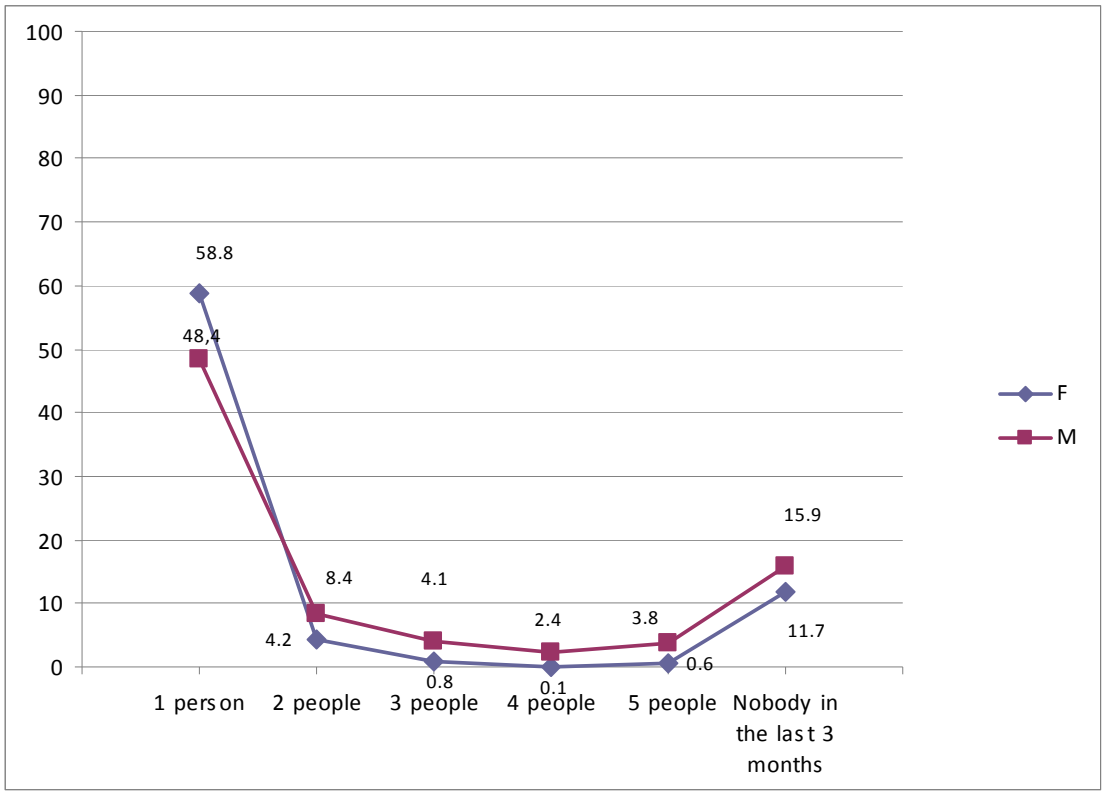

Figure 2. Percentage distribution of sexually active adolescents by sex, reported to number of sexual partners last 3 months

By age, to 18 years, 66.7% (4) of people was reported one sexual partner in last 3 months.
To 19 years, the most have reported a sexual partner in last 3 months, 43.2% (120). Maximum number of sexual partners in the last three months was reported five or more persons, 2.5% (7).

To 20 years, the most have reported a sexual partner in the last three months, 48% (233). Maximum number of sexual partners in the last three months was reported five or more persons, 1.4% (7).

To 21 years, the most have reported a sexual partner in the last three months, 57.4% (319). Maximum number of sexual partners in the last three months was reported five or more persons, 1.1% (6).

To 22 years, the most have reported a sexual partner in last 3 months, 63.1% (260). Maximum number of sexual partners in the last three months was reported five or more persons, 1.5% (6).

At 23 years most have reported a sexual partner in last 3 months, 57.6% (87). Maximum number of sexual partners in the last three months was reported five or more persons, 1.3% (2).

At 24 years most have reported a sexual partner in last 3 months, 59.8% (58). Maximum number of sexual partners in the last three months was reported five or more persons, 8.2% (8).

At 25 years most have reported a sexual partner in the last three months, 71.7% (43). Maximum number of sexual partners in the last three months was reported five or more persons, 1.7% (1) (Table 4).

Table 4. Distribution of students by number of sexual partners in the last three months, by age

Answers	Age (years)								Total
	18	19	20	21	22	23	24	25	
	No. %	No. %	No. %	No. %	No. %	No. %	No. %	No. %	No. %
One person	4 66.7	120 43.2	233 48.0	319 57.4	260 63.1	87 57.6	58 59.8	43 71.7	1124 55.0
2 people	0 0.0	19 6.8	31 6.4	33 5.9	20 4.9	7 4.6	6 6.2	2 3.3	118 5.8
3 people	0 0.0	5 1.8	8 1.6	12 2.2	9 2.2	4 2.6	3 3.1	0 0.0	41 2.0
4 people	0 0.0	1 0.4	2 0.4	6 1.1	2 0.5	4 2.6	3 3.1	1 1.7	19 0.9
5 or more persons	0 0.0	7 2.5	7 1.4	6 1.1	6 1.5	2 1.3	8 8.2	1 1.7	37 1.8
With nobody in the last 3 months	0 0.0	39 14.0	64 13.2	80 14.4	56 13.6	21 13.9	7 7.2	5 8.3	272 13.3
They hasn't sexual relations before	2 33.3	87 31.3	140 28.9	100 18.0	59 14.3	26 17.2	12 12.4	8 13.3	434 21.2
Total	6 100	278 100	485 100	556 100	412 100	151 100	97 100	60 100	2045 100

Non-responses: 31

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Correspondence to:
Suciu Oana
E-mail: oana_suciu96@yahoo.com
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THE IMPACT OF METABOLIC SYNDROME COMPONENTS ON ARTERIAL STIFFNESS

Ionescu V. A., Mancaş S.

Cardiovascular Rehabilitation Department, Institute of Cardiovascular Diseases, ”Victor Babes” University of Medicine and Pharmacy Timisoara

REZUMAT

Obiective: *Studiul nostru şi-a propus: a) să analizeze comportamentul PWV-CF, în funcţie de criteriile de definire a sindromului metabolic; b) în ce măsură PWV-CF ca indice de apreciere a rigidizării arteriale ar putea fi util pentru o mai fină stratificare a riscului cardiovascular.* ***Material şi metode:*** *Am realizat un studiu cross sectional pe un lot de 130 subiecţi asimptomatici. Definirea sindromului metabolic s-a făcut conform recomandărilor ATP III şi IDF, iar pentru studiul rigidităţii arteriale am utilizat aparatul Complior SP. Datele au fost prelucrate statistic cu programul SPSS, versiunea 18, 2010.* ***Rezultate:*** *A fost observat un impact semnificativ statistic al scorului de sindrom metabolic asupra PWV-CF. Aplicând criteriile IDF am găsit diferenţe semnificative statistic ale mediei PWV (11,03 m/sec) în funcţie de prezenţa diagnosticului de sindrom metabolic. A fost găsită o corelaţie pozitivă şi semnificativă statistic între PWV i IMC, mărimea efectului corelaţiei fiind mică.* ***Concluzii:*** *Sindromul metabolic ce reuneşte toate criteriile de definire reprezintă o condiţie de risc cardiometabolic ce favorizează rigiditatea arterială. Viteza undei pulsatile creşte cu numărul componentelor sindromului metabolic, dar riscul vascular se multiplică. Identificarea acestor subiecţi în fază asimptomatică poate facilita includerea lor într-un program de abord comprehensiv de reducere a riscului cardiovascular.*

Cuvinte cheie: *velocitatea undei pulsatile, sindrom metabolic, risc cardio-vascular*

ABSTRACT

Aims: *Our study purposes are: a) to analyze PWV-CF depending on definition criteria of metabolic syndrome;b) how could PWV-CF as an evaluation index of arterial stiffness help for a more acurate stratification of cardiovascular risk.* ***Means and methods:*** *Our research is based on a cross-sectional study of 130 asymptomatic subjects. We defined metabolic syndrome based on ATP III and IDF reccomendations, and we evaluated the arterial stiffness by using Complior SP device. The statistic analysis was made by using SPSS program, 18th version, 2010.* ***Results:*** *There was a statistically significant impact of metabolic syndrome score over PWV-CF. By using IDF criteria there were statistically significant differences of PWV-CF average (11.03 m/sec), depending of the presence of metabolic syndrome. There was a positive and statistically significant correlation between PWV and BMI, but the correlation effect was small.* ***Conclusions:*** *The metabolic syndrome defined by all criteria is a cardio-metabolic state favoring arterial stiffness. The pulsed wave velocity is augmented by the*

number of the components of metabolic syndrome, but the vascular risk is multiplied. Identifying these subjects in an asymptomatic state may facilitate their inclusion in a comprehensive program to reduce cardiovascular risk.

Keywords: *pulse wave velocity, metabolic syndrome, cardio-vascular risk*

INTRODUCTION

The metabolic syndrome is an important component of cardio-vascular risk and frequently comes with arterial stiffness, a strong and independent predictive factor of cardio-vascular morbid-mortality [1-3]. The metabolic syndrome components combined lead to cardio-vascular events trough a multiplicative effect and not an additive one, which suggests that the associated risk of metabolic syndrome is higher than the sum of its individual components. The common element of all the pathological pathways is arterial stiffness. The direct implications of the arterial stiffness as an independent risk factor in vascular pathology has already been proven [4]. It is acknowledged that arterial stiffness corresponds with the progressive loss of the compliance and the elastic properties of the arterial wall; it is also an independent preclinical marker of atherosclerotic vascular disease [5-7].

The hemodynamic consequences of this structural remodeling of the arterial wall are manifested as an abnormal blood pressure profile (rise of the pulsed pressure), as well as an augmentation of the velocity of the carotid-femoral pulse waves. Because in the presence of the metabolic syndrome the arterial lesions already exist, these two markers are recommended to be studied in high risk populations, i.e. patients with metabolic syndrome [8,9].

Our study aims to analyze: a) carotid-femoral pulse wave velocity (PWV) behavior as the gold standard for evaluation of the arterial stiffness, depending on the definition criteria of metabolic syndrome: National Cholesterol Education Program-Adult Treatment Panel III (NCEP-ATP III) or International Diabetes Federation (IDF); b) how could PWV-CF as an evaluation index of arterial stiffness help for a more accurate stratification of cardiovascular risk.

MEANS AND METHODS

We have developed a cross-sectional study that included asymptomatic subjects evaluated in the Cardiovascular Rehabilitation Clinic, Institute of Cardiovascular Diseases Timisoara. Inclusion criteria: the absence of atherosclerotic coronary disease at angiocoronarography. Exclusion criteria: coronary artery disease, significant valvular heart disease, congenital cardiopathies, peripheral arterial disease. Data collection for each patient was based upon the medical chart and all the confidentiality rules were followed. We used the standard definitions and reccomandentions of the European Society of Cardiology for the definition of metabolic syndrome and of the asymptomatic subjects with high SCORE risk [10]. The arterial stiffness was evaluated by using the Complior SR system [11]. The statistical analysis was performed using the EPI Info Program 6.0, 2001 version and the data was processed by the SPSS program, 18th version, 2010.

RESULTS

The studied group (n=130) was characterized by feminine dominance (63.8%) and the mean age of 58.62 ± 8.39 years.

The prevalence of metabolic syndrome varied according to the definition criteria: IDF=52.31% or ATP III=81.5% (Figure 1).

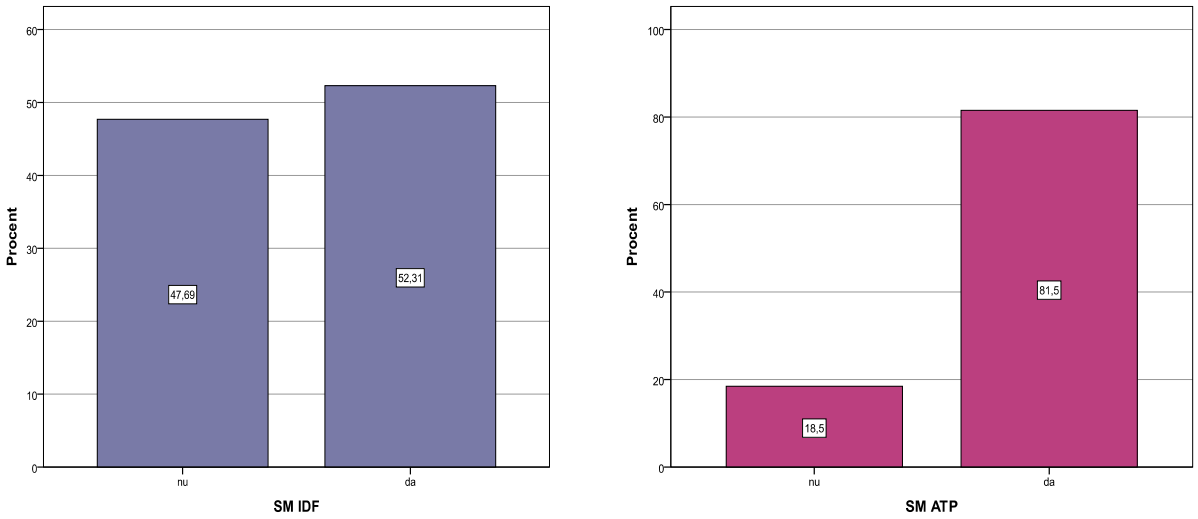

Figure 1. Prevalence of metabolic syndrome

When we compared the distribution of the cases accordingly with the two definitions of the metabolic syndrome we found a moderate concordance of the distribution, k=0.41, p<0.001. The highest frequency of the metabolic syndrome was encountered in the subgroup with four components: 39.7% (Figure 2).

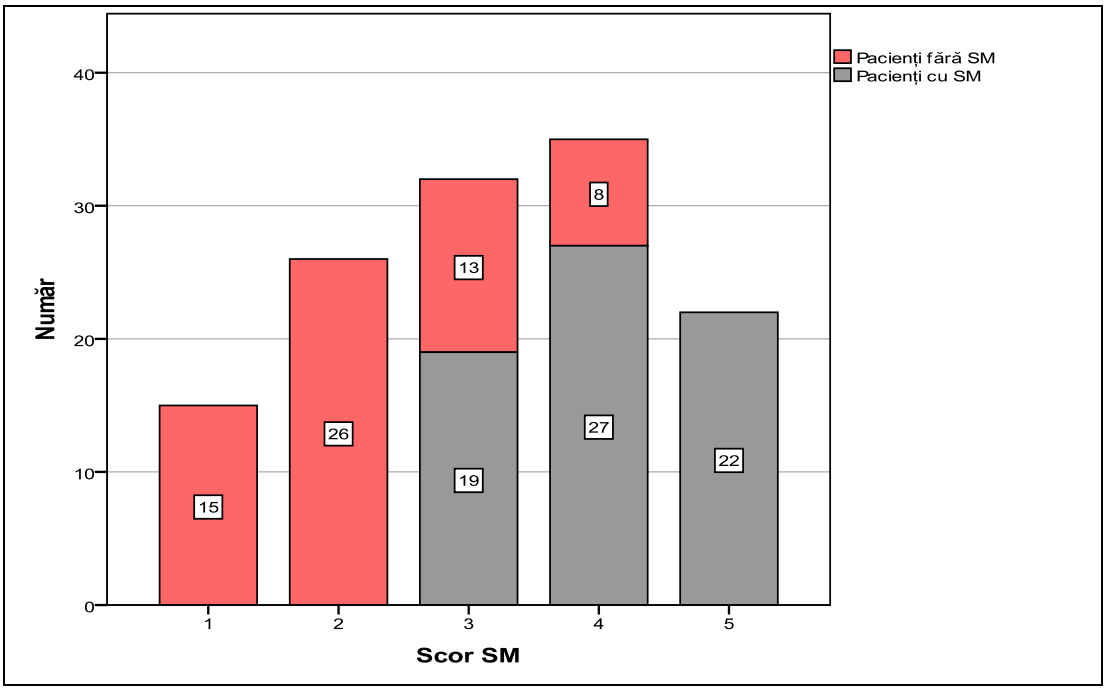

Figure 2. Distribution cases depending on metabolic syndrome score

The impact of the metabolic syndrome score over carotid-femoral artery PWV. For carotid-femoral artery PWV we obtained the following data: average of 10.57 m/sec, median of 10.51 m/sec, module of 9.0 m/sec, extreme values 7 m/sec-15.2 m/sec. We applied the ANOVA test to assess the impact of the metabolic syndrome score over average PWV; a statistically significant impact was observed: F=2.48, p<0.05. We

obtained statistically significant differences of the average PWV only between those without metabolic syndrome (score 2):(M=9.87) and those with metabolic syndrome (score 5):(M=11.46), p<0.05. The differences of the average PWV between all the others scores were not statistically significant.

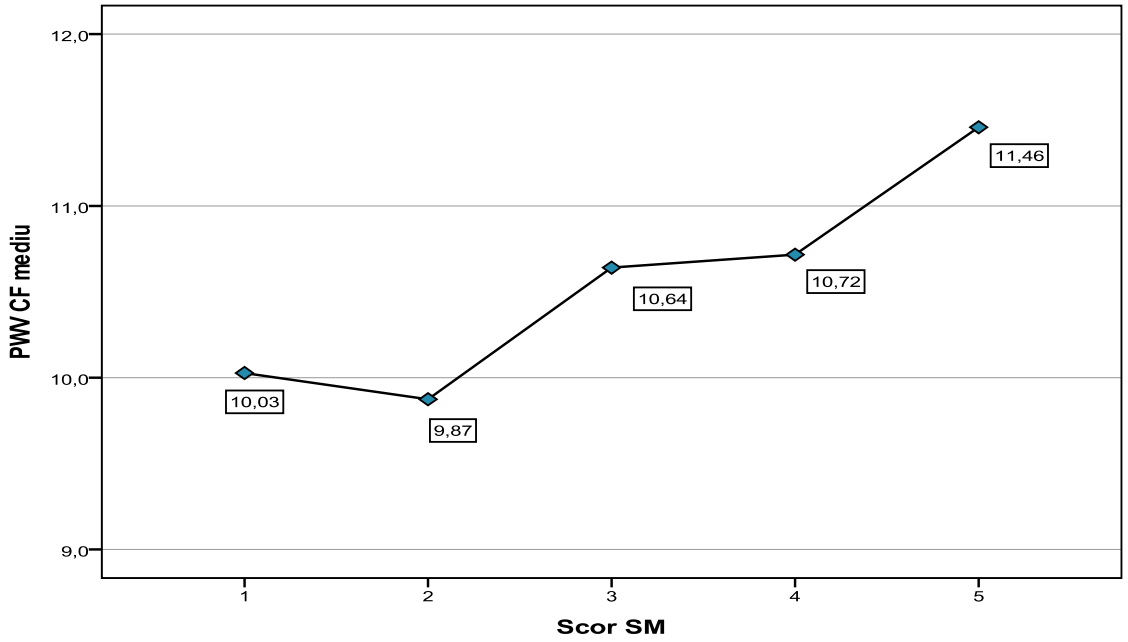

Figure 3. Carotid-femoral PWV value depending on metabolic syndrome score

When applying the IDF criteria we obtained statistically significant differences of the average PWV (11.03 m/sec) according to the presence of metabolic syndrome, U=1518.5, z= -2.748, p<0.01 (Figure 4). We found no differences of average PWV between the patients diagnosed with metabolic syndrome, p>0.05.

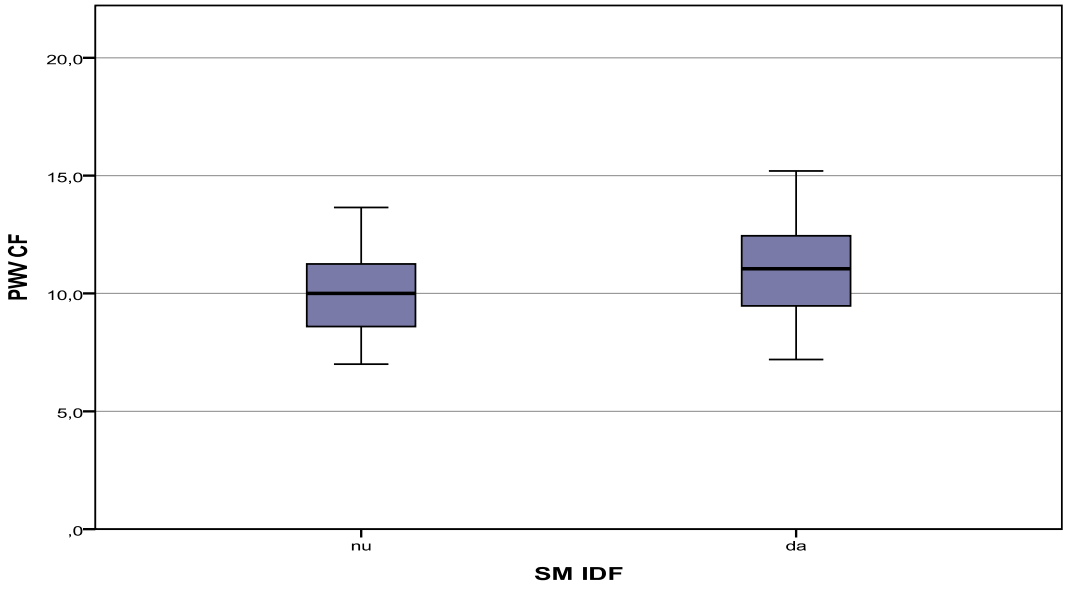

Figure 4. Average PWV depending on metabolic syndrome defined by IDF criteria

We also found a positive and statistically significant correlation between PWV and body mass index(BMI), r=0.276, p<0.01, r^2=0.07; the degree of the correlation was small (Figure 5).

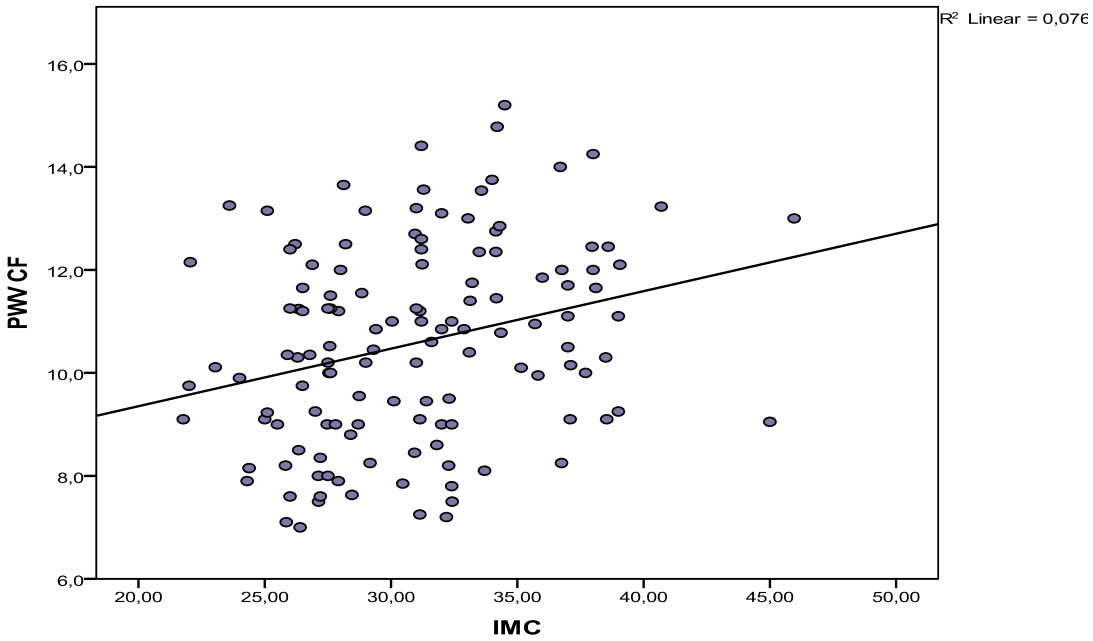

Figure 5. Correlation carotid-femoral PWV and BMI

We found no differences of the average PWV in the presence of the following classification: asymptomatic subjects with SCORE≥5% and SCORE<5% (10.58±2.10m/sec vs. 10.55±1.53m/sec, p>0.05) (Figure 6).

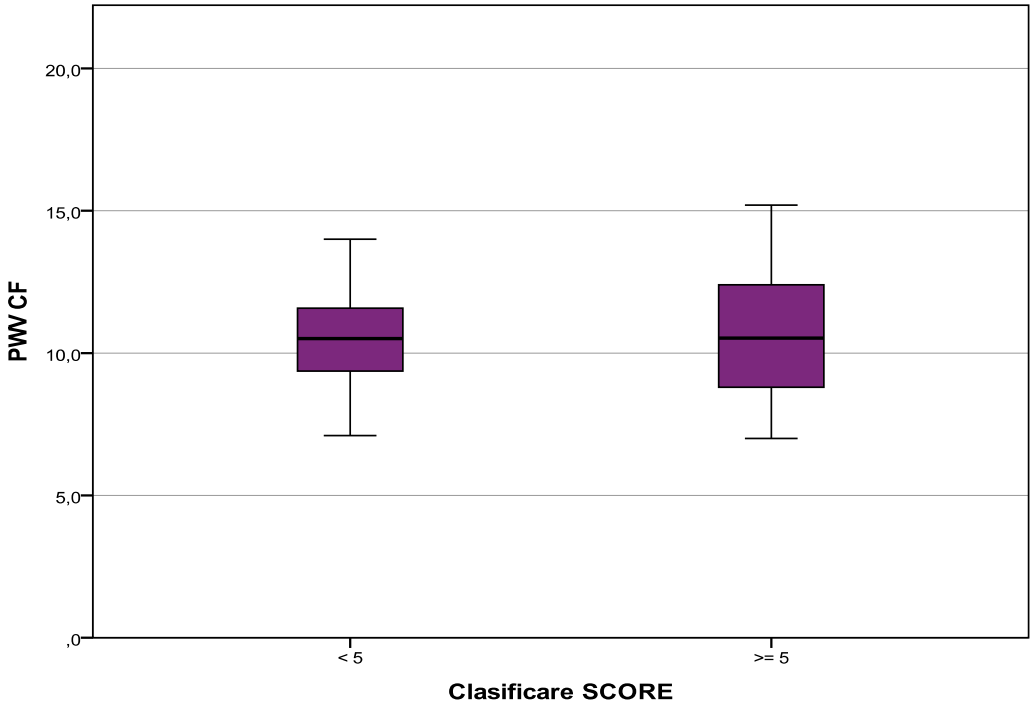

Figure 6. Carotid-femoral PWV and SCORE risk

DISCUSSIONS

Our study has two important aspects. On one hand, the arterial stiffness is related with the ensemble of anomalies also known as metabolic syndrome, centered on insulin-resistance. On the other hand, it brings into discussion the alteration of the predictive value of SCORE risk when associating metabolic syndrome.

The concept of arterial remodeling allows us to assess the functional and structural consequences of the metabolic syndrome on the arterial system in high risk asymptomatic subjects.

No matter the modality to define the metabolic syndrome, the carotid-femoral artery PWV was moderately elevated: 11.47 m/sec for ATP III metabolic syndrome, respectively 11.03m/sec for IDF metabolic syndrome. Laurent S. et all [12] recommends these reference values for carotid-femoral artery PWV: normal < 10 m/sec, moderately high 10-12.3 m/sec and high ≥ 12.4 m/sec. The impact of the metabolic syndrome score on PWV was statistically significant. We must outline that, no matter the modality to define the metabolic syndrome, the association of risk factors exists and they are at the border line between normal and pathological. But all of them, score five, have significantly influenced the behavior of PWV – defining arterial stiffness. We are now asking ourselves if the association of the traditional risk factors included in the SCORE risk for assessing the risk of fatal cardio-vascular event in the next ten years does indeed alter the carotid-femoral artery PWV. The stratification of the asymptomatic subjects according to the SCORE risk did not trigger significant variations of PWV as we have already proven. Many researchers have tested the predictive power of the association between the metabolic syndrome and the Framingham risk for the occurrence of fatal or non fatal cardio-vascular events [13,14]. It seems that, although the metabolic syndrome is a strong predictor of cardio-vascular disease it did not have the same value as the Framingham Score in predicting coronary events [15]. When metabolic syndrome was added to the Framingham Score it had no additional predictive value. Moreover San Antonio Heart Study Analysis has proven a false positive predictive value for cardio-vascular disease of 34% [16]. Recent data support the clinical use of determining the PWV in asymptomatic subjects with traditional cardio-vascular risk factors, enabling a more accurate risk stratification regarding subclinical atherosclerosis [10-17].

CONCLUSIONS

The metabolic syndrome defined by all criteria is a cardio-metabolic state favoring arterial stiffness. Asymptomatic subjects with metabolic syndrome have a higher velocity of the pulsed wave compared to those without metabolic syndrome. The pulsed wave velocity is augmented by the number of the components of metabolic syndrome (however statistically insig-nificant), but the vascular risk is multiplied. Identifying these subjects in an asymptomatic state, may facilitate their inclusion in a comprehensive program to reduce cardiovascular risk.

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Correspondence to:
Ionescu Vlad Alexandru
Str. Narcisei Nr.8, Giroc, Timis
Phone: 0722221802
Email: i_andru@yahoo.com
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STUDY ON MEAT QUALITY AND NUTRITIONAL VALUE OF BROILERS FED DIETS CONTAINING GTS 40-30-2 SOY COMPARED TO DIETS CONTAINING CONVENTIONAL SOY

Cirnatu D.[1], Jompan A.[2]

1."Vasile Goldis" Western University Arad, Faculty of Medicine, Department of Hygiene
2."Vasile Goldis" Western University Arad, Faculty of Medicine, Department of Family Medicine

REZUMAT

Pentru a compara valoarea nutritionala si calitatea carnii provenite de la pui in hrana carora a fost introdus srot de soia modificat genetic GTS 40-30-2 a fost efectuat un studiu pe un lot de 130 broileri pentru o perioada de 42 zile. Puii de 1 zi au fost repartizati aleatoriu in 5 loturi de studi (26 subiecti fiecare, sex ratio 1:1) in ratia carora proteina provenita din soia a fost inlocuita in proportii crescande cu srot de soia modificata. Cantitatea de proteina din srot de soia a fost aceiasi la fiecare lot. Au fost efectuate masuratori pentru greutatea carcasei si a unor parti anatomice. De asemenea au fost efectuate analize chimice pentru determinarea proteinei, grasimii, umiditatii. pH-ului, azotului usor hidrolizabil precum si a valorii energetice a carnii provenite de la subiectii luati in studi. Nu au fost constatate diferente semnificative statistic intre cele 5 grupuri studiate pentru niciunul dintre parametrii analizati.

Cuvinte cheie: *soia modificata genetic, calitatea carne, valoare nutitionala carne*

ABSTARCT

A 42-days feeding trial was conducted with broiler chickens in order to compare the nutritional performance of genetically modified GTS 40-30-2 soybeans with conventional soybeans. The 1 day old birds were randomly allocated to five study groups (26 subjects each, sex ratio 1:1). In the diet of each group an amount of protein from soy was replaced with genetically modified soy. The level of protein in soy, either modified, or non-modified, was the same. Organs and carcass weights were measured on the 42 days old birds and chemical analyses were performed during May - June 2009. No statistically significant differences were observed in mortality, growth performance variables or carcass, organ yields and meat quality between broilers consuming diets produced with genetically modified soybean fractions and those consuming diets produced with conventional soybean fractions. Results of

chemical protein, fat, moisture, easily hydrolysable nitrogen, pH analyses and energetic value of meat show no significant difference for subjects from any study group.

Keywords: *genetically modified soy, meat quality meat, nutritional value*

INTRODUCTION

The application of modern biotechnology to food production presents new opportunities and challenges for human health and development. Recombinant gene technology, the most well-known modern biotechnology, enables plants, animals and microorganisms to be genetically modified (GM) with novel traits beyond what is possible through traditional breeding and selection technologies. It is a recognized fact that techniques such as cloning, tissue culture and marker-assisted breeding are often regarded as modern biotechnologies, in addition to genetic modification.

According to the definition of the Codex Alimentarius Commission (CAC 2001a) (according to the Cartagena Protocol on Biosafety), modern biotechnology is defined as the application of 1) in vitro nucleic acid techniques, including recombinant deoxyribonucleic acid (DNA) and direct injection of nucleic acid into cells or organelles, or 2) fusion of cells beyond the taxonomic family, that overcome natural physiological reproductive or recombination barriers, and that are not techniques used in traditional breeding and selection.

The novel traits in genetically modified organisms (GMOs) may also, however, carry potential direct risks to human health and development. Many genes and traits - but not all - used in agricultural GMOs are novel and have no history of safe food use. Several countries have instituted guidelines or legislation for mandatory premarket risk assessment of GM food. On the international level, agreements and standards are available to cover these concerns.

The use of biotechnology in the development of glyphosate- tolerant soy greatly contributes to efficiency of crop production, although there are public concerns about the ecological risks and the health safety of the byproducts of these transgenic crops [1]. Substantial equivalence of a conventional parental line and a transgenic line is established using phenotypic characteristics and compositional analysis including nutrients, toxicants and allergens [2]. Other parameters, such as feeding value and protein characteristics, are used to further appraise the safety of new products. Substantial equivalence has been established between conventional and untreated glyphosate-tolerant soybeans [3] and with those that have been treated with glyphosate at manufacturer suggested rates for cropland [4]. As GM-soy is unlikely to be highly poisonous, "toxicity" is an unhelpful concept and difficult to assay. In contrast, nutritional studies in which GM crop-based diets are fed to young growing animals should reveal their possible harmful effects on metabolism, organ development, immune/endocrine systems and gut flora which together determine the safety of the GM-crop and the development of the young into healthy adults.

AIMS

Our objective was identifying the effects of genetically modified soy on the broiler with possible public health implications, taking into consideration the importance of chicken in contemporary human nutrition. The present study is focused on broiler meat quality and nutritional aspects.

MATERIALS AND METHODS

A 42-day feeding trial was conducted with broiler chickens to compare the nutritional performance of GMO soybeans with nontransgenic soybeans. For comparison,

diets were produced with soybean fractions obtained from a nontransgenic near-isoline (control) and transgenic commercial. Diets were fed to Ross broilers (n = 26/group, 50% male and 50% female) in 3 phases. Starter, grower, and finisher diets contained 33, 29, and 26.4% soybean meal, respectively. In the diet of each group an amount of protein from soy was replaced with genetically modified soy line GTS 40-2-3 in the following proportion : 0 - group I; 25% - group II, 50% - group III; 75% - group IV, 100% - group V (Table 1).

Table 1. Components of feed used in the three stages of growth (starter – S, growth - G and finishing -F)

Ingredients	Group I			Group II			Group III			Group IV			Group V		
Formula	S	G	F	S	G	F	S	G	F	S	G	F	S	G	F
Corn	454	505	510	454	505	510	454	505	510	454	505	510	454	505	510
Wheat	100	100	150	100	100	150	100	100	150	100	100	150	100	100	150
Soy conventional(heat treated)	330	290	264	247.5	217.5	198	165.5	145	132	82.5	72.5	66	0	0	0
Modified soy (heat treated)	0	0	0	82.5	72.5	66	165.5	145	132	247.5	217.5	198	330	290	264
Fish flower	550	30	0	550	30	0	550	30	0	550	30	0	550	30	0
Sunflower hull	26	35	36	26	35	36	26	35	36	26	35	36	26	35	36
PC	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40

After 42 days all subjects were sacrificed by cervical dislocation and the necropsy was performed after carefully weighing the carcasses, parts of carcasses and internal organs. The following characteristics were evaluated in meat: protein (Kjeldahl method), fat (Soxhlet method), moisture (SR ISO 1442/1997), pH (standardized method - STAS 9065/8-74), easily hydrolysable nitrogen (determined according to STAS 9065/7-74). Meat caloricity was calculated according to the relation which involves the raw gross energy (GE) issued from burning 1g of proteins, lipids and carbohydrates in calorimetric bomb: GE (Kcal/Kg) =5.70 Kcal x g proteins + 9.50 Kcal x g lipids + 4.2 Kcal x g NFE.

The study was conducted in accordance with the principles and guidelines for the care and use of agricultural animals in research (FASS, 1999), which were consistent with the recent recommendations issued by the International Life Sciences Institute [5], and, as applicable, were in compliance with FDA (1979) and EPA (1983) good laboratory practice regulations. The broilers were randomly assigned by study group to floored pens (providing approximately 0.09 m^2 per bird), with approximately 13 cm of clean wood shavings in an environmentally controlled building with incandescent lighting. Incandescent lighting was provided for 23 to 24 h/d for approximately for all study days. The target room temperature was 25-26°C. Within each pen, water was provided. A chick feeder tray was placed in each pen. Environmental conditions (floor space, temperature, lighting, bird density, feeder and water space) were similar for all treatments. Birds and remaining test feeds were disposed of by composting, conforming to local and state regulations.

The experimental design of the broiler chicken feeding study closely followed that of commercial practice and therefore the results should only be indicative of the

commercial feeding and production value of the various soybean lines.

RESULTS AND DISCUSSIONS

The performance of the chickens fed on different diets in this study was compared using standard nutritional performance variables and organ and carcass yields. No biologically significant differences in BW, weight gain, or carcass yields were observed between broiler chickens from the study groups (Table 2).

Table 2. Average weight (g) of the carcasses, viscera and some somatic areas

Study group	Carcasses	Wings	Legs	Chest	Heart	Liver
I	1930(116,1)	89.5(7)	229.3(11.5)	486.5(12.1)	9.5(1.4)	54(4)
II	1953(115)	95.5(8)	232.6(11.2)	515.1(11.3)	10(1.9)	52(5.5)
III	1740(111)	85.3(7)	205.2(12)	470.2(13)	10(1.9)	46(5.6)
IV	1832,6(113,2)	92.6(7)	211.2(11)	445.3(11.5)	9.5(2)	48(4.2)
V	2297(115)	114.2(7.2)	255.8(12)	510(9.5)	9.5(1.9)	50(5)

The statistical significance of weight differences between groups were measured by means of one way ANOVA tests. There was no significant effect of the modified soy level on the chicken weight ($F(4.25)=1.89$, $p>.05$), on the wings weight ($F(4.25)=2.4$, $p>.05$), on the legs weight ($F94.25)=1.89$, $p>.05$), on the chest weight ($F(4.25)=1.53$, $p>.05$, or on the heart weight ($F(4.25)=0.16$, $p>.05$) and liver weight ($F(4.25)=2.9$, $p>.05$

The data resulted from analytical chemistry have been calculated as percentage and presented in Tables 3-8.

Guidelines to assess the safety and nutritional quality of the food and feed fractions obtained from GM crops with modified input traits, such as insect resistance and herbicide tolerance, are based on the concept of demonstrating nutritional equivalency between transgenic crops and their nontransgenic counterparts [6,7]. These guidelines recommend evaluating the whole grain or processed feed fraction composition using a defined list of components with a known nutritional or anti-nutritional impact. Although the ingredient list is extensive, it is possible that other unspecified components could potentially impact the nutritional quality of the grains or processed feed fractions obtained from GM crops. Therefore, animal feeding trials have sometimes been conducted to evaluate the wholesomeness of grains or processed feed fractions from GM crops to determine if the particular genetic modification could have potentially resulted in unintended changes that could impact the nutritional quality of the grains or processed feed fractions. The broiler chicken model has been used in nutritional equivalency evaluations with whole grains and processed fractions from GM plants because of their rapid growth and reported sensitivity to nutritional deficiencies.

As the data were pooled from the published study, it is not easy to see what was the significance - if any - of the small differences in the study such as the slightly lower body weights, breast and fat pad weights obtained with the GTS lines (particularly with GTS 40-3-2) for the utilization of GM soybean. It would have been preferable to measure the nutritional performance of individual birds (or small groups) fed on different diets and then compare them after statistical analysis. In the absence of this we have to rely on the authors' conclusion that the design of the experiment gave the upper limit of differences in weight gain of 3.5% and gain/feed ratio of 2% and that the GTS lines

vs. parental line was within this limit. Thus, with this restriction, the feeding value of the GTS lines for broilers was practically equal to that of the parental soybean line.

The broiler meat quality may have a different meaning according to the poultry industry sector it is involved in and then the consumers may have special preferences which are not always in accordance with those accepted by the producers. The meat quality is governed by its chemical composition: protein, fat, ash or water. The chemical composition of chicken meat can be determined by various factors. Nutrition, as one of the most important external factors in broiler production, can have a crucial effect on the chemical composition of broiler meat. The factors that can have a highly variable effect on the chemical composition and on the poultry meat quality include the following: choice of raw materials to be used in feed formulation, their characteristic chemical composition, different protein and energy values of formulated rations, different degrees of nutrient utilisation, different, mutual (synergistic and antagonistic) effects of feed component. Although there are no statistically significant differences between study groups, the average fat value of the subjects from the conventional soy diet is the lowest (Table 3).

Table 3. Statistical interpretation of fat values for the five study groups

Study group	Minimum	Maximum	Average	Standard Deviation	Percentile
I	5.76	7.1	6.27	0.49	6.911
II	5.5	7.1	6.35	0.53	6.83
III	4.7	7.3	6.44	0.86	7.3
IV	4.7	6.2	5.63	0.47	6.0
V	4.7	7.2	6.05	0.79	6.84

During the observation of the protein values obtained in our study (Table 4), the lowest value was for 100% modified soy feed subject, but the lowest average was for group II subject (fed with 50% GMO soy and 50% conventionally soy diet).

Table 4. Statistical interpretation of protein values for the five study groups

Study group	Minimum	Maximum	Average	Standard Deviation	Percentile
I	18.45	19.85	19.25	0.40	19.50
II	18.44	19.61	18.94	0.40	19.45
III	18.44	19.1	18.75	0.19	18.92
IV	18.3	19.88	19.24	0.49	19.72
V	18.18	19.8	19.08	0.49	19.80

Proteins and lipids of muscle tissue are important meat quality parameters. They contribute substantially to the nutritional characteristics of meat. Given the increasing importance of quality in any production and hence, broiler production, a number of studies have been conducted on the effect of different factors (genetic and non-genetic) on the nutritive value of broiler meat quality. Žlender et al. (1995) [8] report that the protein content of leg muscles and that of breast muscles and breast skin ranges from 15.8 to 17.9% and 21.9 to 23.5%, respectively. The fat content of thigh muscle, as determined by the same authors, was within the 10.6 to 15.6% range and that of breast muscle ranged from 3.9 to 8.4%. Similar data were reported by

Bogosavljević- Bošković et al. (1999) [9]. Breast muscle contains about 22% proteins. In commercial hybrids (Ross 308,Cobb, Hybro), the protein content of breast muscle is on the average of 3.6 to 4.2% higher than that of thigh muscles [10]. One of the main reasons poultry meat consumption has increased in the last decade is the nutritional value of the meat. The fat in poultry meat is located in the skin and is therefore easily removable compared to other meats, enabling consumers to adopt a more low-fat type of meat in their diets. Along with this low-fat aspect, the fat in poultry meat is lower in saturated fatty acids and higher in unsaturated fatty acids. This fat deposition can vary among species and is diet-dependent. Therefore, poultry meat can easily be incorporated into a well-balanced diet to improve health.

Table 5. Statistical interpretation of meat moisture values for the five study groups

Study group	Average	Minimum	Maximum	Standard Deviation	Percentile
I	72.60	72.46	72.81	0.15	72.80
II	72.73	72.12	73.61	0.49	73.34
III	72.43	71.58	73.11	0.52	73.05
IV	73.20	72.47	73.82	0.43	73.60
V	73.08	72.64	73.57	0.35	73.55

The statistical interpretation of moisture content of the meat subject study I presented in Table 5. The higher values were obtained for the subject from the 100% conventional soy feed group. As the moisture percentage increases in meat, the fat percentage decreases. As the skin is removed from both the dark meat and the light meat, most of the fat is removed, and the moisture percentage then increases in chicken meat. Also, the higher the fat percentages in meat are, the higher the energy as measured by kcal/100 g is.

Table 6. Statistical interpretation of pH values for the five study groups

Study group	Minimum	Maximum	Average	Standard Deviation	Percentile
I	5.68	6.1	5.89	0.12	5.992
II	5.46	5.92	5.83	0.14	5.911
III	5.66	5.96	5.86	0.08	5.96
IV	5.9	5.96	5.93	0.02	5.951
V	5.9	5.96	5.93	0.02	5.951

The pH values are shown in Table 6. We obtained pH values between 5.83 and 5.93, thus respecting the limits of 5.8-6,0 which indicates that the product is fresh, in accordance with Romanian Directive 86 (2002).

Table 7. Statistical interpretation of easily hydrolysable nitrogen values for the five study groups

Study group	Minimum	Maximum	Average	Standard Deviation	Percentile
I	19.16	20.2	19.85	0.35	20.182

II	19.25	19.7	19.45	0.14	19.7
III	19.4	20.3	19.95	0.28	20.21
IV	19.4	20.6	19.88	0.38	20.33
V	19.75	20.4	20.08	0.17	20.22

The values obtained for easily hydrolysable nitrogen (Table 7) show that there are no differences between subjects. All the determinations are within the accepted parameters.

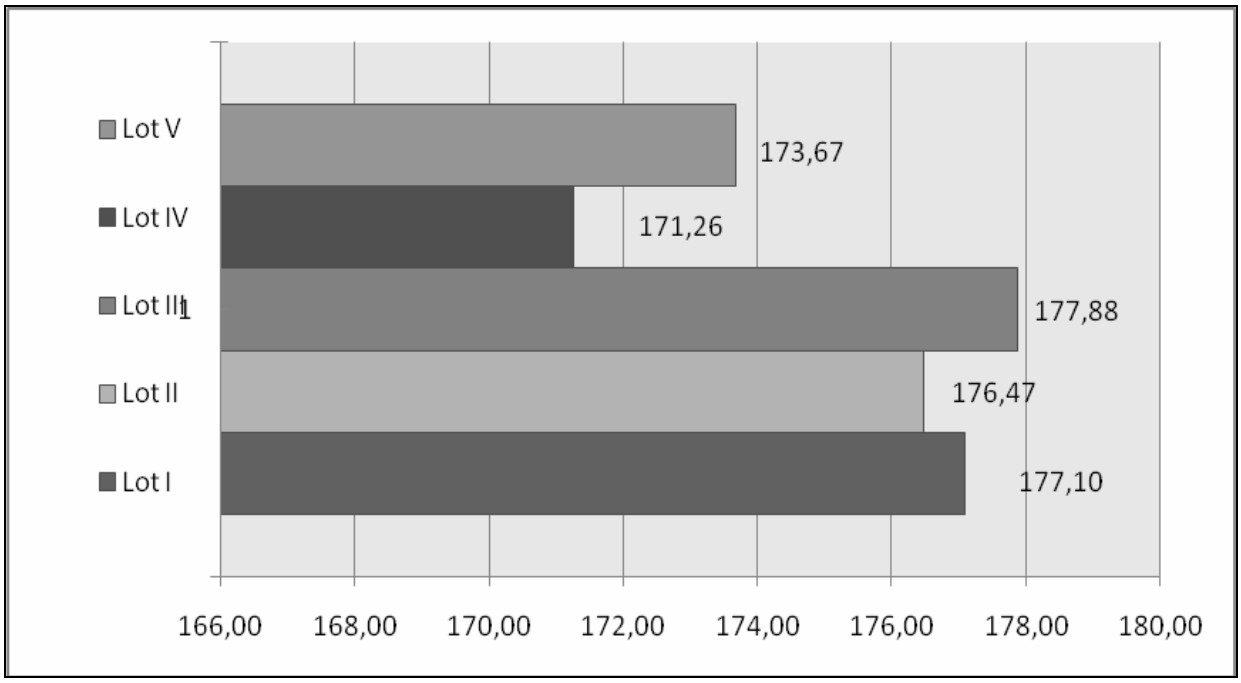

Figure 1. Comparison between average energetic value of broilers meat from group studies

Comparison of broiler performance for birds fed the diet containing GMO soybean meal and the conventional soybean varieties showed no significant difference. These results were similar to those reported by Hammond et al. (1996) [11], who tested soybean meal derived from glyphosate-tolerant soybeans developed via biotechnology. The results are also in accordance with the results summarized by Aumaitre et al. (2000) [12] for a large variety of genetically modified plants fed to different types of livestock, including broilers.

CONCLUSIONS

1. The results of this broiler feeding study support the conclusion that there are no differences in the parameters evaluated among broilers fed soybean meal produced from glyphosate-tolerant (GTS 40-3-2), and conventional soybeans
2. Although there are no statistically significant differences between study groups, the average fat values of the conventional soy diet subjects are the lowest
3. Comparison between broiler meat energetic value for birds fed on the diet containing soybean meal RR and other nontransgenic soybean showed no significant differences

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Correspondence to:
Daniela Cirnatu
Arad, no 1 Feleacului Street,
Faculty of Medicine, Western University Vasile Goldis Arad 310396, Romania.
Fax:040257212204,
Phone: 04 0723851854,
E-mail: danielacirnatu@yahoo.com
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THE CONTRACEPTIVE METHOD BETWEEN MEDICAL RECOMMENDATION AND COMPUTERIZED DECISION AID

Sas I.[1], Tuţă – Sas I.[2]

1. "Dr. Dumitru Popescu" Clinical Hospital Timisoara, Obstetrics and gynecology Department
2. "Dr. Dumitru Popescu" Clinical Hospital Timisoara, Hygiene Department

REZUMAT

Introducere. *Serviciile online care oferă asistenţă medicală (contraceptivă) computerizată cu scopul luării unei decizii optime sunt de regulă aplicaţii interactive – chestionare auto-administrate care ajută şi asistă utilizatorii (femeile, partenerii lor şi/sau furnizorii lor de îngrijiri de sănătate) pentru a decide între mai multe opţiuni contraceptive.* ***Obiective.*** *În urma unei ample cercetări online, se analizează obiectivele acestor programe în funcţie de modelul aplicaţiei, feed-back-ul acestor programe la 5-10 ani de la debut, caracteristicile şi preocupările utilizatorilor de asistenţă contraceptivă computerizată.* ***Rezultate şi discuţii.*** *Toate programele care stau la baza acestor sisteme de selecţie a contracepţiei sunt oarecum similare. Utilizatorii par a fi în marea lor majoritate femei (91,5%), iar vârsta medie a acestora este de sub 35 de ani (89,5%). În format online, datorită şi protecţiei anonimatului, avem de-a face cu răspunsuri mai sincere, cel puţin la întrebările legate de comportamentul sexual şi la cele legate de anumite cerinţe formulate în direcţia metodei contraceptive. În cadrul consultaţiilor clasice pentru alegerea unei metode contraceptive, accentul este pus pe detaliile medicale.* ***Concluzii.*** *Nu poate fi negat rolul internetului în viaţa contemporanilor noştrii, dar nici rolul medicului nu poate fi negat sau uitat într-un domeniu sensibil precum al contracepţiei.*

Cuvinte cheie: *contracepţie, asistenţă computerizată, internet*

ABSTRACT

Introduction. *The online services providing medical (contraceptive) computerized aid aiming an optimal decision are usually represented by interactive applications – self-administered questionnaires helping and assisting the users (women, their partners and/or their medical care providers) in order to decide between more contraceptive options.* ***Objectives.*** *Following an ample online research, the objectives of these programs are analyzed based on the application model, the feed-back of these programs after 5 – 10 years from the start, the characteristics and preoccupations of the computerized contraceptive aid users.* ***Results and discussions.*** *All the programs on which these contraception selection systems are based are somehow similar. The users appear to be mostly women (91.5%), and*

their medium age is under 35 years of age (89.5%). In online format, because of the anonymity protection also, we deal with more sincere answers, at least for the questions related to the sexual behavior and for those related to certain requests regarding the contraceptive method. During the classical consultations for the choice of a contraceptive method, the accent is on the medical details. ***Conclusions.*** *The role of the internet in our contemporaneous cannot be denied, but the role of the physician in a delicate area like contraception cannot also be denied or forgotten.*

Keywords: *contraception, computerized decision aid, internet*

INTRODUCTION

The contraception is just one of the medical paradigms where a decision can be made with the aid of computers.

The online services providing medical (contraceptive) computerized aid aiming an optimal decision are usually represented by interactive applications – self-administered questionnaires helping and assisting the users (women, their partners and/or their medical care providers) in order to decide between more contraceptive options.

Thus, this applications start by taking into account that all the contraceptive methods may prevent a pregnancy, but also the fact that some of them have other benefits not to be ignored. The condoms may help in preventing sexually transmitted diseases (STD), while hormonal IUD may result in more comfortable menstruating periods, or even can completely stop the menstruations for a predetermined time period. The condoms and the contraceptive pills represent the starting point, where all the existing contraceptive methods result.

All the same, these applications are respectful to the fact that the choice of the contraceptive method is a personal matter, thus a series of personal aspects are taken into account – age, medical history, number of sexual partners – but also a number of volitionally characterized aspects – the patients intention to diminish or stop the menstruation, the refusal to take a pill every day, the wish that no one else (including / especially the partner) knows a contraceptive method is used, etc. In conclusion, these applications are designed to examine the contraception from two perspectives – health and life-style – and the results to characterize as well as possible the needs of the people in the present day.

One of the first and most frequently used applications "My Contraception Tool" developed according to a British project uses two types of questionnaires, a short questionnaire taking approximately 5 minutes to complete, and a long one taking about 15 minutes to complete. The latter contains supplementary questions about the medical history of the user, and it was intended for the persons over 35 years of age and for the persons with pathological antecedents. Certainly the decision to use a particular questionnaire belongs to the user initially, but according to the answers to the first questions regarding the age, the number of sexual partners, the user is guided, most of the times, to the long, complete version of the questionnaire.

The result – the score for every contraceptive method – is calculated by corroborating the following two components:

- The value that the user attributed to every contraceptive method in order to show the importance of its characteristics and attributes (as, for example, the avoidance of an unwanted pregnancy);

- The evaluation of every contraceptive attribute – based on the last researched data (for example, the chance to become pregnant using a contraceptive method) and on the

correspondence to the personal difficulty degree (for example, how difficult do you think it is the fact you have to remember to take or use the contraception).

The best contraceptive methods receive degree 1 (or 100%) and the rest receive proportionally lower degrees. Thus, the results of every attribute separately are totaled in order to obtain a score for every contraceptive option.

Thereby, some systems generate one list of contraceptive options with the related scores, but others generate a list with ideal choices and a list with reasonable choices, yet every application annuls some options as soon as the response to one question exclude it (ex. the planning of a future pregnancy automatically excludes the option of surgical sterilization).

This type of applications can be used by both women and men regardless of age, and all the answers are strictly confidential and can not be later connected with the user.

These programs also include in the questionnaire a section where the user may look for the nearest specialized services, the computer generating a list of adequate locations for every single context – sexual health centers, family planning clinics, emergency contraception services and services for different other tests or treatments.

OBJECTIVES

In this study, following a ample online research, the objectives of these programs are analyzed based on the application model, the feed-back of these programs after 5 – 10 years from the start, the characteristics and preoccupations of the computerized contraceptive aid users – their contraceptive behavior, the interactive capacity of these applications, the medical meaning of the questions included in the questionnaires, the accuracy of the answers in a computerized questionnaire compared to the answers given to a specialist in the context of an usual consult, the correspondence between a contraceptive decision resulted by computerized assistance and a decision resulted after a classical consult and the perspective of these programs.

RESULTS AND DISCUSSIONS

The objectives of these online systems for selecting contraceptive method are multiple. These programs were created to help people in choosing a contraceptive method, according to the increasingly computerized world we are living into, that is, without seeing a physician. By means of these applications it is intended to help the very busy people, very shy people, with low material possibilities, but was also discussed the fact that the physicians are increasingly busy and do not allocate enough time to the particularities of every single case.

All the programs on which these contraception selection systems are based are somewhat similar, all seem to use interactive questionnaires to attain a sexual, medical and life-style profile of the user, subsequently exposing, in order, the most appropriate contraceptive options.

As regards the users characteristics, they seem to be in a large majority women (91.5% - Choosing Wisely), and their medium age is under 35 years old (89.5% - Choosing Wisely). As for the preoccupations of the users about contraceptive options, generally, they had at least one preoccupation (75.3% - Choosing Wisely), and the most frequent preoccupation was represented by the gaining of weight (65.3% - Choosing Wisely).

The online contraceptive selection application “Choosing Wisely” carried out in 2008 a statistical survey (13 months after the start) regarding the medical history of the users. The majority accused problems

related to the menstrual period (18.7% abundant menstruations, 34% painful menstruations, 28.8% irregular menstruations) and only very small percents presented different medical problems (2.3% endometriosis, 2% uterine fibroma, 0.6% breast cancer). Other characteristics for the users of this application were: 11% smokers in the group under 35 years of age and 16.6% smokers in the group over 35 years of age. About the contraceptive preferences of the users the Choosing Wisely statistics showed that approximately 54.9% prefer to avoid menstruations, 8.8% prefer a permanent contraceptive method, 36.5% have needle phobia, 66.5% sustained they have the capacity to remember the daily administration of the pill, and 72.7% said an unwanted pregnancy would be devastating. Within the section of preoccupations regarding the use of contraception, the users manifested worry towards gaining weight (49.2%), indisposition (40.0%), the maintenance/ regain of the procreation capacity (39.7%), acne skin (34.4%), headache (26.9%), cancer (22%), bones density related problems (16%) and breast-feeding (7.8%). About planning a future pregnancy, the users reported they plan to have a child during the next year (3%), during the next 5 years (29.3%), they don't plan to have a child (19.7%), while 48% were not sure.

Even from the start of the questionnaire the interactive character of the questions is observed, thus, from the answers to the first two questions – are you a woman or a man? / how old are you? – the rest of the questionnaire is adapted. Thereby, the age over 35 years automatically leads the user to the longer (complete) version of the questionnaire. This version is focused on medically connected questions (already existing pathologies, plans including future pregnancies / births); marking a preexisting pathology considered at high risk (ex. breast cancer) exclude the user fro the questionnaire, advising for a contraceptive decision based on a classical detailed consult, at which moment a list of specialized centers with necessary contacts is generated.

Likewise, there is also a series of questions regarding the sexual behavior (ex. with how many persons did you had sexual relations during the last year) trying to establish a user's profile for this area, aiming to orientate the contraceptive decision towards a method which, in addition, prevents the STD.

There is also a section of the questionnaire about the characteristics of the menstrual periods (ex. premenstrual symptoms, hemorrhages/abundant menstruations), adderssed with the purpose of a menstrual adjustment, from both a qualitative point of view and a periodicity point of view (these adjustments are in the present much easier to obtain due to the additional benefits of some of the contraceptive methods).

The section where the user states the most important (1→ 4) reasons in choosing one contraceptive method is a large action where from more than 20 contraceptive characteristics it is recommended to mark as much as 4. These reasons are related to the life style of each user (ex. I want to avoid headaches, I want to avoid any type of injection, I want to avoid the loss of any sensation related to the sexual intercourse, etc.).

As for the answers' accuracy, in the online format, also because the protection of the anonymity, the answers are more sincere, at least for the questions related to the sexual behavior (ex. the number of sexual partners) ant to those related to certain requests about the contraceptive method (ex. I want to avoid that my partner finds out I use a contraceptive method).

During the classical consultation for the selection of the contraceptive method, the accent is on the medical details, the questions asked by the specialist are in

particular medical ones and less related to the lifestyle, and the doctor is, at most, interested in the financial possibilities of the patient regarding a certain contraceptive method.

In order to unfold more pertinent conclusions, for this study, beside the online research, for a first sample composed of 24 patients, we studied the contraceptive result obtained by computerized aid; at that moment the patients in this sample were not using any contraceptive method (either they were in a brake of contraceptive hormonal pills, or they were choosing for the first time a contraceptive method). In case of a second sample composed of 22 patients, the problem was studied somehow retrospective, comparing the contraceptive method resulted from computerized aid and the contraceptive method resulted from a previous classical consultation.

Thus, analyzing the results of the first sample (24 patients), for 10 patients we totally agreed to the contraceptive choice suggested online, both after finding the medical history and a first clinical examination, and after a strict specialty consultation (biochemical examinations – hematological investigations, investigations of the liver, HPV dosage – and biophysical – mammary and trans-vaginal ecography). For 11 patients the contraceptive method suggested by the online application, seemed at first (after finding the medical history and clinical examination) an option worth following, but after a detailed examination, both ecography and laboratory investigations, we considered another method more appropriate (ex. the viral C hepatitis found during laboratory examinations totally excluded oral hormonal contraception – Yasmine – combined contraceptive – dospirenone 3 mg and ethinylestradiolum 0.03 mg, choosing a non hormonal IUD; a polifibromatosis discovered trough ecography indicated a hormonal IUD – Mirena, etc). For three patients the problem was a financial one (ex. IUD Mirena or the Yaz contraceptive pill in unemployed women, etc).

Analyzing the results for the second sample (22 patients), only for 9 patients the online contraceptive decision coincided with the classical, previous one. For another 9 patients we considered that the computer suggested method may be considered without being the ideal option; we remarked in these cases that the online decision was influenced by the patients' requests regarding the collateral characteristics of the contraceptives. In the case of 4 patients we do not agreed with the contraceptive decision obtained online, we considered the option not to be in agreement with the medical history of the patient, with their hormonal profile and with the financial possibilities of two of the patients.

CONCLUSIONS

It is known that the internet is the main information source regarding contraception for Romanian people (study conducted by GfK Romania), being mentioned by 83% of the respondents. Next among the information means is the doctor (41%), the partner (38%), the brochures in the medical consulting rooms (36%), television (30%) and the women magazines (29%).

It is also known that the adolescents in the entire world spend every week more than 31 hours on the internet. The most searched domains are contraception and family planning, aesthetic medicine and diets as a Great Britain study shows. According to Telegraph online, the adolescents spend around three and a half hours discussing with friend through MSN messaging and for approximately two hours they watch videos on the YouTube. The young people are also interested in diverse aesthetical medicine procedures, as the increase of the breasts or the collagen implants. They spend approximately one hour and half gathering information about family planning and the contraceptive methods.

Taking into account the increasing incidence of the young people informing themselves online about contraception and family planning, and also about the importance of this decision, the success of the SRH specialists and of those in the logistic technology domain to develop web-data base for contraceptives and soft to help in taking decisions regarding contraception, it is a benefit to the health in general and specially the health of reproduction. The fact that these programs use more criteria for every case (Multi-Criteria Decision Analysis) denotes professionalism.

Initially, these web-assistances for optimal decision making aimed mostly the technical domain. Today, a wider range of domains receive computerized help for optimal decision making.

The personal conclusions of the study on which this paper was based are somewhat contradictory, because they cannot deny the role of the internet in the life of our contemporaneous, but the role of the doctor cannot be forgotten or denied in a sensible area as contraception and the health of the reproduction and family planning. The most important conclusions are:

- In the present day, the internet is the main information provider regarding contraception, and the development of computerized aid programs for contraception decision making helped the users in selecting information, extracting correct, useful and appropriate information for each of the infinity of available information;
- The online assistance programs regarding a contraceptive decision making are more than useful for a lot of categories of persons as the very busy ones, the very shy ones (teenagers), the ones from the rural areas, those who for diverse reasons cannot see a doctor, etc., but, for those in a risk category as those over 35 years old, those with different pathological antecedents, etc., the classical consult with a doctor must remain the primary method in contraceptive decision making ;
- Nevertheless, an extensive experience makes me reluctant about the accent on the non-medical requests of the users related to a contraceptive method (not to be daily used, not to be noticed by the family/partner, etc) that may exclude the most appropriate method medically, etc;
- I also consider that indicating a hormonal contraceptive method without a minor but extremely important clinic examination and without the user to see the prospect of the contraceptive, constitute a highly risk with long term consequences.

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Correspondence to:
Ioana Tuță-Sas
E-mail: ioanasastm@yahoo.com
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HEPATO-PULMONARY CYSTIC ECHINOCOCCOSIS IN A PATIENT WITH NORMAL IMMUNOLOGICAL STATUS. CASE PRESENTATION

Calma C.L.[1], Vlaicu B.[2], Iacobiciu I.[1]

1."Victor Babes" University of Medicine and Pharmacy Timisoara, Department of Parasitology
2. "Victor Babes" University of Medicine and Pharmacy Timisoara, Department of Hygiene

REZUMAT

Echinococoza este o helmintozoonoză foarte răspândită produsă de speciile genului Echinococcus. Echinococoza chistică (CE) este o infecţie produsă de stadiul larvar al speciei ***Echinococcus granulosus sensu lato*** *şi este cea mai frecventă formă prezentă la gazda intermediară umană. Reprezintă o importantă problemă de sănătate publică în zonele endemice datorită indicelui de morbiditate destul de ridicat şi prin localizarea chistului hidatic la nivelul diferitelor organe ceea ce poate conduce la afectarea funcţionalităţii normale a întregului organism. În continuare prezentăm cazul unui bărbat de 31 de ani, provenit din mediul urban, internat în anul 2007 într-o clinică de chirurgie din zona de vest a României, prezentând diagnosticul de chist hidatic pulmonar şi hepatic. Se practică două intervenţii chirurgicale consecutive, la interval de 14 zile, pentru rezolvarea celor două chiste hidatice. Nu se foloseşte protecţie antihelmintică, utilizându-se albendazol înaintea intervenţiei chirurgicale toracice, datorită creşterii riscului ruperii spontane a chistului hidatic. Post-operator se administrează albendazol, ceea ce face să existe protecţie antihelmintică înaintea celei de-a doua intervenţii pentru rezolvarea chistului hidatic hepatic. După tratament, pacientul este externat, vindecat chirurgical. În urma prezentării la control nu s-a constatat apariţia complicaţiilor sau a recidivelor.*

Cuvinte cheie: *echinococoza chistică, chist hidatic hepatic, chist hidatic pulmonar, benzimidazoli, chistectomie*

ABSTRACT

Echinococcosis is a widespread zoonotic infection produced by the species of the genus Echinococcus. Cystic echinococcosis (CE) is an infection caused by the larval stage of the ***Echinococcus granulosus sensu lato*** *species and it is the most common form of the disease found in human beings. It is an important public health problem in endemic areas because of the relatively high morbidity index and the location of hydatid cyst in the various organs which may lead to impairment of the normal functioning of the entire body. We present the case of a 31-year old man, coming from the urban area, hospitalized in 2007 in a*

surgery clinic in the western part of Romania, presenting the diagnosis of the pulmonary and liver hydatid cyst. He was subjected to two consecutive surgeries at an interval of 14 days, in order to resolve the two hydatid cysts. Protection with anti-parasitic (albendazole), prior to the thoracic surgery, was not used because of the increased risk of spontaneous hydatid cyst rupture. Post-surgical procedure albendazole is administered and this is what makes anti-parasitic protection to exist before the second intervention to solve the hepatic hydatid cyst. After the treatment, the patient, being surgically cured, was discharged from hospital. Following referral to the medical examination there were no complications or relapses found.

Keywords: *cystic echinococcosis, liver hydatid cyst, lung hydatid cyst, benzimidazole, cystectomy*

CASE PRESENTATION

L.A., a 31-year old male, coming from the urban area, unemployed

Positive diagnosis

- Pulmonary (lung) hydatid cyst stage I in medium right lung lobe
- Liver hydatid cyst stage I in the IV segment of right liver lobe

Reasons for hospitalization. The patient presented himself in a surgery clinic in the Western part of Romania accusing right upper quadrant pain and right chest pain.

Personal physiological history and personal history pathology: acute hepatitis in childhood.

Family history: parent (mother) with arterial hypertension (high blood pressure)

Anamnestic information: The patient had had right upper quadrant pain for about one month and cough with serous expectoration for about a year, for which he presented himself to the surgery clinic and was hospitalized for investigation and specialized treatment.

He had not followed any kind of medication before referral to the doctor.

Physical examination: General condition slightly influenced, spatio-temporal oriented, no motor or sensory disorders, normal skin color, regular heart rate, blood pressure 120/70 mm Hg.

Respiratory: chest rule, symmetrical pulmonary ampliations, normal pulmonary sounding, normal vesicular murmur present in both lung fields.

Digestive: abdominal pain on palpation in the right upper quadrant, tumor 5/5 cm palpable below the costal right sliding along the edge, mobile with the breathing, well-delimited, painful.

Presumption diagnostic

Well-defined tumor in the right upper quadrant.

Laboratory tests: pathological data guiding to a parasitic or allergic pathology: 7.31% increase in eosinophils and elevated ESR's to 40 mm/hour. The remaining investigations revealed no pathological data: WBC = 7240/mm^3, ALT = 40 U/L, AST = 28 U/L, total bilirubin = 0.70 mg/dl, glucose = 92 mg%, urea = 36 mg%, creatinine = 0.85 mg%.

Chest radiography showed an opacity of supracostal intensity, homogenous, consistent with crescent hipertransparente superior located images, about 8 / 7 cm, located in the right lobe of the lung.

Pulmonary and chest computed tomography (CT) indicated a cystic formation of 8.3/7 cm located in the medium lung lobe, protrusion of the lower lobe, with a homogeneous structure; cystic image with well-defined walls, homogeneous structure

located in IV segment, lower protrusion in the abdominal cavity.

Following investigations, the diagnosis was established as hydatid cyst stage I in medium right lung lobe and in the IV segment of right liver lobe.

Certainty diagnosis

- Pulmonary (lung) hydatid cyst stage I in medium right lung lobe
- Liver hydatid cyst stage I in the IV segment of right liver lobe

Differential diagnosis of pulmonary cystic echinococcosis by pulmonary tuberculosis. Lung tuberculosis is characterized by fever, night sweats, cough with sputum, chest pain, anorexia, weight loss. A particularly dangerous form of TB is MDRTB chemoresistant (multidrug-resistant tuberculosis). Chest radiography highlights nodules (opaque) and caves (bright regions) in the back and top of the lung.

Differential diagnosis of liver cystic echinococcosis by liver tumors, that are characterized by the fact that often are discovered incidentally during imaging examinations or abdominal surgery.

Treatment

It was decided that the patient requires surgery. Medium right lung lobe cystectomy was done together with the evacuation of the lung hydatid cyst, followed by pleural right drainage with apiration. The post-surgical patient's evolution was favourable, following also a treatment with anti-parasitic (albendazole 400 mg twice a day). Lung hydatid cyst removal was done together with the suppressing of the the drain tube 6 days after surgery and chirurgical threads were removed 14 days after surgery. The patient exited the hospital with healing surgical wound and with the following recommendations: 14 days bed rest, exercises of respiratory recovery, albendazole 400 mg twice a day and return over 14 days for rehospitalization for the surgery of the liver hydatid cyst.

After that period of time the patient was readmitted in the hospital and another surgical intervention was decided, consisting of cystectomy with partial Lagrot pericystectomy, subhepatic drainage and drainage of residual cavity. The post-surgical evolution was favourable, together with the suppression of the subhepatic drain 5 days after the surgery, the progressive removal, under ultrasound supervision, of the drainage tube out of the residual cavity and the suppression of the chirurgical threads 9 days after the surgery. The pacient exited the hospital with healing surgical wounds and the following recommendations: avoidance of physical exercises for 3 months and of the intense physical exercises for 6 months; treatment with albendazole 400 mg twice a day for three months with the reiteration of the treatment after a break of one month; periodical X-ray and ultrasound examination. Following referral to the medical control complete surgical cure of the patient was found.

Discussion

Hydatid disease is a parasitic cyclozoonotic infection caused by the species Echinococcus granulosus of the genus Echinococcus. The most common location of the hydatid cyst is in the liver (70%), followed by the lungs (30%), but any organ can be involved, whether the location is abdominal or pelvic, or even less common locations that can make the diagnosis more difficult and the treatment more complex [1,2]. The most frequent association for hydatid lesions is represented by the one of liver and lung 4% - 25% [3].

Simultaneous hydatid cyst cases of the lung and liver can be found through the pre-surgical procedures of radiography, ultrasound and CT, in the absence of symptoms, or even intra-surgical procedure by palpation through the diaphragm. As well as this, pre-surgical undetected liver cysts were removed surgically by toracotomy or thoraco-hydatid cysts- laparatomy made to

eliminate hydatid lung cysts. In cases of right pulmonary hydatid, at the pre-surgical investigations, by radiographic and ultrasound, should be also sought the concomitant subdiafragmatice liver cysts, which can be removed in one surgery (thoracotomy) [4]. In the case of the lung surgical treatment the mandatory conservation of the parenchymal lung during surgery is aimed. Delay in diagnosis can lead to parenchymal damage. In the case of the irreversible changes of the lung parenchyma it is necessary to perform radical resection (lobectomy) [5]. Some studies show that pre-surgical administration of albendazole in the case of lung localization is not recommended, because it increases the risk of spontaneous cyst rupture [5,6]. In the case of simultaneous infection with Echinococcus granulosus (lung and liver) an extra attention should be paid to the treatment. The classical approach would consist of a combined drug treatment of benzimidazoles derivatives (albendazole) and a two-stage surgery in lung and liver locations or an extensive thoraco-phrenic-laparotomy stage, exclusively in the right locations, respectively hydatid lung cysts associated with localization of the cyst at the level of the liver dome. Most commonly there are applied two successive resection surgery cysts. Postoperative evolution of the patient is followed by laboratory investigations (radiography and ultrasound) [7,8]. Post-surgery treatment with derivatives of benzimidazoles (particularly albendazole) for at least three months is mandatory in order to prevent relapses and the emergence of secondary echinococcosis [9].

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Correspondence to:
Crenguta L. Calma, MD
3 Dumitru Kiriac Sq.
Timişoara, Timis
Phone: 0040723617416
E-mail: crenguta.calma@umft.ro
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GENERAL ASPECTS ABOUT HUMAN HYDATIDOSIS / ECHINOCOCCOSIS - BIBLIOGRAPHIC STUDY

Calma C.L.[1], Vlaicu B.[2], Iacobiciu I.[1]

1. "Victor Babes" University of Medicine and Pharmacy Timisoara, Department of Parasitology
2. "Victor Babes" University of Medicine and Pharmacy Timisoara, Department of Hygiene

REZUMAT

Scopul acestei lucrări este de a prezenta câteva date generale privind echinococoza/hidatidoza. Acest scurt referat prezintă un scurt istoric cu cele mai vechi atestări documentare ale bolii. Apoi sunt cuprinse cele mai noi date privind clasificarea genotipurilor de Echinococcus granulosus, incluzând şi principalele date epidemiologice, dar şi răspândirea geografică a acestora şi a celorlalte specii ale genului. Caracterele morfologice ale formelor chistice, precum şi ciclul biologic prezintă caracterele comune şi cele diferenţiale ale speciilor genului Echinococcus. Ultima parte a lucrării prezintă cele mai noi tendinţe în tratamentul, prevenţia şi controlul echinococozei .

Cuvinte cheie: *echinococoza chistică, echinococoza alveolară, genotipuri, benzimidazoli*

ABSTRACT

The purpose of this paper is to present some general data on echinococcosis / hydatidosis. This report presents a brief history of the oldest documentary attestation of the disease. As well as this, it covers the most recent classification of Echinococcus granulosus genotypes including the main epidemiological data and their geographical spread along with the geographical spread of the other species of the genus. The morphology of cystic forms and the life cycle present the common and differential characteristics of the species of the genus Echinococcus. The last part presents the latest trends in treatment, prevention and control of echinococcosis.

Keywords: *cystic echinococcosis, alveolar echinococcosis, genotypes, benzimidazole*

INTRODUCTION

Echinococcosis/Hydatidosis is a matter of topical interest due to the issues it raises - largely known today. It is a widespread zoonosis that is of particular importance for human pathology, being both a public health issue and an economical problem. Therefore, E/H enforces its presence in the core of parasitology specialists' concerns because of the large number of cases of human beings affected in many countries, because of the fact that in many others it is

an emerging and re-emerging disease [1], but also because of the significant losses in livestock products [2].

Numerous communications from the medical literature, both in countries where echinococcosis / hydatidosis is eradicated, but especially in countries where it is endemic, show interest in this problem.

SHORT HISTORY

Hydatidosis (from the Greek Χρώμα νερού which means "water color") or cystic echinococcosis is known since ancient times [3].

The earliest documentary attestations of the disease are included in the Ebers papyrus (c. 16 BC) and the Talmud, being discovered during embalming mummies, but they contain only a clinical and morphological, general description without stating etiology, given the level of knowledge at that time. A more detailed description of hydatid disease was made by scholars of ancient Greece like Hippocrates of Kos (460-375 BC), who describes some hydatid cyst as "tumors filled with water," Aretaeus (9-79 AD) Galen of Pergamon and then (130-200 AD) and Rhazes (865-925 AD).

TAXON OF THE GENUS ECHINOCOCCUS

Plathelminthes phylum: flat worms with soft body, dorsoventrally flattened, with one or more segments, lacking the general cavity, the digestive system is incomplete or absent.

Cestode Class: endoparasites flatten dorsoventral, they consist of a linear colony of segments, the digestive system is absent.

Eucestoda Subclass: true tapeworms, adults have a previous organ for fixing called scolex, have an elongated body called strobilla, consisting of linear sets of reproductive organs called proglottids, are hermaphrodite.

Order Cyclophyllidea: they have a scolex with four round suckers and a reinforced hook rostelum; strobila present proglottids in different stages of development, each being clearly demarcated by external proglottids segmentation; the eggs are spherical/round, not operculate, containing a six hook non-ciliated oncosphere, called hexacant embryo.

Family Taeniidae: shows adults located in the small intestine of carnivores and human beings; intermediate hosts are different mammals; their scolex is equipped with a reinforced double rostelum crown of hooks; genitalia is odd in each proglottids, having the genital pores with marginally located in each proglottids, with irregular alternating right / left; eggs nuts have radial ribs called embriofori; metacestode (larval form) is spherical and can be cysticircle, cenur, hydatid cyst or strobilocircle.

Taeniidae family consists of two genera, Taenia and Echinococcus, between which phylogenetic relationships were established by combining molecular sequence of cytochrome c oxidase mitochondrial DNA subunit 1 (cox1 gene) with a subunit of NADH dehydrogenase (nad1 gene). Thus, it is proved that Echinococcus is monophyletic, descending from a single population [4].

Gens Echinococcus: so far, have been recognized in terms of important medical and taxonomic 4 species: Echinococcus granulosus (causing cystic echinococcosis), Echinococcus multilocularis (causing alveolar echinococcosis), and Echinococcus oligarthrus and Echinococcus vogeli (both species causing polycystic echinococcosis).

THE ADULT AND LARVAL FORMS MORPHOLOGY OF THE GENUS ECHINOCOCCUS

1. The adult forms morphology of the genus Echinococcus

The adult cestodes of the genus Echinococcus develop from protoscolics and, morphologically, present a scolex, a neck and a strobila, usually consisting of three distinct proglottids, one is immature, the second is mature and the third is pregnant (or containing eggs) [5].
The major morphological difference between species of the genus Echinococcus is given by the length of the cestode. Echinococcus granulosus has about 2-7 mm in length, while Echinococcus multilocuralis is often shorter, only 4 mm long [6]. On the other hand, Echinococcus vogeli has proved to be 5.6 mm long and Echinococcus oligarthrus up to 2.9 mm in length [7].

2. The larval forms morphology of the genus Echinococcus

There are also differences between hydatid cyst morphology of different species of Echinococcus. Echinococcus granulosus cysts are filled with hydatid fluid and uniloculare; cysts of Echinococcus multilocularis are multiloculare and contain less liquid; cysts of Echinococcus vogeli and oligarthrus are large, polycystic, because the germinative membrane proliferates, both inward to form septa that divide the hydatid cyst sections, and outwards to create new cysts. Like Echinococcus granulosus cysts, the Echinococcus vogeli cysts are fluid-filled [5,6].

EPIDEMIOLOGY AND GEOGRAPHICAL DISTRIBUTION

Echinococcosis is widespread acrross the globe, including different geographical areas, unevenly distributed because the disease is more common in rural areas, being linked to certain occupations like: butchers, shepherds, breeders of cattle, sheep, pigs. Each species of the genus Echinococcus has affinity for different hosts and distinct geographical spread.

Molecular studies using mitochondrial DNA sequences have identified 10 distinct genetic types (G1-10) in the species Echinococcus granulosus [8,9]. These include two sheep strains - genotypes G1 and G2, two cattle strains - genotypes G3 and G5, a strain of horse (equine) - genotype G4, a strain camelids - G6 genotype, a strain of swine (pigs) - genotype strain G7 and deer - G8 genotype. G9 genotype was described in pigs in Poland [8] and genotype G10 in reindeer in Eurasia.

Echinococcus granulosus sensu lato occurs worldwide. The exceptions are Iceland and Greenland, countries considered free of the presence of this species. Each strain (or newly recognized species) has a location in a specific geographic area. G1 is the cosmopolitan sheep strain, being widespread in Europe, Middle East, Africa, parts of Asia, Australia, New Zealand and North and South America. Tasmanian sheep strain G2 was identified in Asia, South America, Africa and Europe and in Tasmania. G3 strain is widespread in Asia and Europe. Strain G4 (Echinococcus equinus) is frequently found in Europe, Middle East and Africa. G5 strain (Echinococcus ortleppi) has been documented in Europe, Africa, parts of Asia and South America. Camelids G6 strain occurs in the Middle East, Africa, Asia and South America. G7 swine strain was identified in Europe, Russia, South America and Mexico, while the closely related strain, strain G9 has been reported only in Poland. G8 and G10 strains deer are to be found in North America, especially in Canada and some northern U.S. states and in Eurasia.

GENERAL NOTIONS ON THE LIFE CYCLE OF ECHINOCOCCUS GENUS SPECIES

Cestodes of genus Echinococcus have a life cycle involving obligatory presence of definitive and intermediate host. Human is an accidental or "aberrant" intermediate host.

1. Definitive hosts
Echinococcus granulosus: wild dogs and other canine (wolf, jackal, dingo, coyote)
Echinococcus multilocularis: fox, rare canine, feline, coyotes, wolves
Echinococcus vogeli: bush dogs and canine
Echinococcus oligarthrus: wild cats

2.Intermediate hosts
Echinococcus granulosus: sheep, goats, pigs and other wild herbivores
Echinococcus multilocularis: small rodents
Echinococcus vogeli: rodents
Echinococcus oligarthrus: rodents

3. Biological cycle
Adult stage of any species of the genus Echinococcus is located in the small intestine of definitive hosts. Pregnant proglottids release eggs wich reach the external environment through the faeces. After the ingestion of the eggs by their intermediate host, the eggs reach their small intestine and release the oncospheres that penetrate the intestinal wall and migrate through the circulatory system into various organs, especially liver and lungs. In these organs, the oncospheres develop into a larvae form - hydatid cyst - that is growing gradually. Inside the hydatid cysts, protoscolex and daughter-cysts are developed. Final host becomes infected after ingestion of organs containing cysts. After their ingestion, the protoscolex attaches itself to the intestinal mucosa and the adult stage developes [10].

CLINICAL AND LABORATORY DIAGNOSIS

The most common location of the hydatid cyst is in the liver (70%), followed by the lungs (30%), but any organ can be involved, whether the location is abdominal or pelvic, or even less common locations that can make the diagnosis more difficult and the treatment more complex [11,12]. The most frequent association for hydatid lesions is represented by the one of liver and of the lung 4% - 25% [13].

Depending on the location of hydatid cyst in the body, the patient could be asymptomatic, even in cases where the cysts can be detected ultrasound, radiographic, CT or MRI or could be symptomatic, even if the size of the cysts is very small.

Hydatid cyst of pulmonary localization in symptomatic patients is seen in the cough, dyspnoea and/or chest pain.

Hydatid cyst of liver localization in symptomatic patients is seen in abdominal pain, abnormal abdominal tenderness, right upper quadrant pain, hepatomegaly.

Complications may include jaundice, rupture of the cyst in the bile ducts or of the bronchial tree or anaphylactic reactions, even anaphylactic shock [14] with high fever, pruritus, facial and eyelid edema.

Laboratory diagnosis is based on a combination of radiological and immunodiagnostic techniques. Computed tomography (CT) , magnetic resonance imaging (MRI) and ultrasound are useful for diagnosing cystic lesions situated in all organs and also to determine the extent and condition of the cystic lesions [15,16]. Antibody assays are useful to confirm the presumptive radiological diagnosis, although some patients with cystic echinococcosis do not show a detectable immune response [17]. Today, the ELISA test is used to detect IgG antibodies against Echinococcus granulosus.

TREATMENT

The cystic echinococcosis is treated by surgical removal of the cysts through Lagrot type complete or partial perychistectomy procedure combined with medication using derivatives of benzimidazoles (albendazole or mebendazole) pre-and post-surgical procedure. Lately, laparoscopic surgery, especially for liver hydatid cyst, gains more and more ground [6,18].

If there are multiple cysts in organs or tissues or cysts are located in regions of risk, surgery is impracticable. For inoperable cases, medication and / or PAIR technical (puncture-aspiration-injection-re-aspiration) are alternative treatment options [6,19,20].

In case of an alternative treatment, using only chemotherapy, the preferred dose of albendazole is 10-15 mg / kg / day, because it has a very good intestinal absorption and penetrates inside the cyst. Minimum length of the treatment is 3 months. Mebendazole, at a dose of 40-50 mg / kg body weight / day for at least 3-6 months, is an alternative to albendazole .

PREVENTION AND CONTROL

The latest studies have revealed that the most effective means of prevention and control against echinococcosis is a combination of vaccination in sheep (EG95 vaccine) and of anti-parasitic treatment in dogs [21]. According to this model, vaccination coverage of 75% of the sheep population would require only 6 months of treatment and would reduce echinococcosis in both intermediate and final hosts at very low levels.

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Correspondence to:
Crenguta L. Calma, MD
3 Dumitru Kiriac Sq.
Timişoara, Timis
Phone: 0040723617416
E-mail: crenguta.calma@umft.ro
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IMPLICATIONS OF ORAL AND DENTAL PATHOLOGY IN THE INITIATION OF PREMATURE LABOR

Rîcă R.[1], Rîcă A.M.[2], Râcă N.[3]

1. Faculty of Dental Medicine, UMF Craiova
2. PhD candidate, UMF Craiova
3. Obstetrics and Gynecology Clinic, Craiova County Hospital

REZUMAT

Studiul analizează implicarea patologiei buco-dentare în declanşarea travaliului prematur (din 4730 naşteri pe 3 ani, 1273 au fost naşteri premature - clinica Obstetrica Ginecologie Craiova). Cea mai frecventă patologie buco-dentară a fost patologia infecţioasă. Lotul de naşteri premature pe anul 2010 a fost de 450, dintre acestea 30 au prezentat afectiuni buco-dentare evidente. La acestea au fost determinate o serie de markeri predictivi pentru travaliul prematur (IL 6, PCR, Ca ionic, prezenţa coloniilor microbiene în placa dentară). Studiul acestor markeri arată implicarea procesului infecţios buco-dentar în declanşarea naşterii premature şi subliniază importanţa practică a determinărilor markerilor de predicţie în vederea profilaxiei naşterii premature.

Cuvinte cheie: *naştere prematura, patologie orală şi dentară, prostaglandine, IL 6*

ABSTRACT

The study analyzes the implication of oral and dental pathology in the initiation of premature labor (1273 premature births out of 4730, for a period of 3 years – Obstetrics & Gynecology Clinic, Craiova). The most frequent oral and dental pathology was the infectious pathology. In 2010 there were 450 premature births, 30 of those presenting explicit oral and dental pathology. We have made determinations for a series of predictive markers for premature labor (IL 6, PCR, Ca, the presence of germ colonies in the dental plaque). The study of these markers have shown the implications of oral and dental infectious processes in the initiation of premature labor and emphasizes the practical importance of predictive marker determination concerning premature birth prevention.

Keywords*: premature birth, oral and dental pathology, prostaglandins, IL 6*

INTRODUCTION

Premature birth is a clinical obstetrical entity which defines itself as a discontinuance of the normal progress of pregnancy at a gestational age of 28 to 37 weeks, the product of conception being a fetus with an overall weight of 2500g [1].

In 1997 WHO has redefined prematurity as a consequence of the higher success rate obtained in small and very small new born

recovering rate: the expulsion/the extraction from the uterus of a conception product with a length of at least 25 cm, that once separated from his mother displays life signs, after at least 22 weeks of amenorrhea [2].

Prematurity is one of the main causes for the increased number of mentally and physically disordered children. The rates of mortality and infant morbidity amongst these premature babies are very high. In a high percentage of cases the etiology of premature birth remains unknown. In Romania the rate of premature birth lies around 10% being more than twice as high as in Belgium, Netherlands, Sweden or Switzerland (around 4.2%) and more than three times lower than in countries like India and Pakistan. Premature birth is a condition that applies to many women with a disadvantaged social status, with a lower educational level, with small income and unsatisfactory medical pregnancy supervision. Some of the most common etiological factors are:

1. Medical maternal factors: malformed uterus, hypoplastic uterus, cervical-isthmic failure, cardiopathy, diabetes, urinary infections, oral and dental infections.
2. Feto-placental factors: multiple pregnancies, feto-maternal blood group incompatibility, placenta praevia, premature rupture of membranes, placental abruption.
3. Social and economic factors: small income, marital status, poor nutritional status.

In most cases premature birth is caused by an association of those factors [3].

The oral and dental pathology in pregnancy is very often represented by inflammatory pathology (gingivitis, stomatitis, perio-dontitis, oral candidiasis, dental abscesses) [4]. Pregnancy is also frequently accompanied by a salivary pathology (pregnancy sialorrhea) and a nauseating pathology (emesis gravidarum) [4].

The mechanisms through which these pathologies trigger the premature birth are very complex. The analysis of the premature birth trigger action mechanism, induced by oral and dental inflammatory pathology implies hyperthermia and maternal and fetal metabolic changes, which can lead to a state of uterine hyperexcitability that determines the apparition of uterine contractions. More severe is the entrance of germs and toxins from the inflamed oral or dental structures into the blood stream, then into the placenta, fetal membranes, and amniotic fluid, inducing chorioamnionitis [5]. The asymptomatic bacteremia is also involved in premature birth. In fact, the bacterial compounds stimulate the prostaglandin synthesis in fetal membrane cells and decidual uterine cells [3].

The prostaglandins trigger the uterine contractions, being involved in labor induction. In chorioamnionitis, the prostaglandin synthesis is 30 times higher than normal. The pathogenic agents and their toxins from the dental bacterial plaque travel until they reach the amniotic and decidual cells inducing the secretion of A2 phospholipase (PLA2). The phospholipase catalyzes the hydrolytic cleavage of glycerophospholipids fixed onto the cellular membranes, synthesizing arachidonic acid (AA), a precursor of prostaglandins and endothelins (ET) that initiate the premature labor [6,7].

The risk of premature birth in pregnant patients with oral and dental inflammatory processes colonized with group B streptococcus was considerably reduced when they were being treated for conditions [2].

After birth, the diagnosis can be confirmed by examining the placenta and the fetal membranes which will show the infection. Pregnant women with severe gingival

pathology are 10 times more prone to experience premature birth. Prostaglandins also act by intracellular synthesis of AMPC, which favors a rising of free calcium levels. Calcium is also very important in triggering uterine contractions, coupling the excitation with the contraction of the uterine muscle [8].

The bacterial dental plaque, as an ecologic system, has an intense metabolic activity. This biofilm is formed by colonizing bacteria trying to attach itself to the smooth surface of teeth through an extracellular matrix. The pellicle-coated tooth surface is colonized by Gram-positive bacteria such as Streptococcus sanguis, Streptococcus mutans, and Actinomyces viscosus and Gram-negative bacteria such as Fusobacterium nucleatum, Prevotella intermedia, Capnocytophaga species and many others. These germs produce extracellular polysaccharides (EPS) which have a very important role in tooth microbial adhesion, this process being facilitated by a saliva with high viscosity [2]. Miller has placed the dental cavity in the group of oral and dental conditions that are dependent upon the presence of bacteria. Pregnant women are prone to develop dental cavities and therefore are prone to having a premature labor [6].

The bacteria that induce the destruction of mineral and organic substrate of the tooth through acids and proteolytic by-products further complicate the mineral metabolic disorder. Pregnant women also have an increased secretion of saliva and manifest emesis gravidarum. The modified diet in pregnancy with high carbohydrate and low protein intake favors an increase of pathogenic germs at the tooth surface [2,9,10].

The oral and dental pathology also influences the pregnant women's diet (e.g. poor masticatory function because of gingivitis). Low protein and mineral intake affects enzymatic and hormonal synthesis and therefore the fetal and placenta development and growth are affected too. The fetus and the placenta, through enzymatic and hormonal synthesis maintain the evolution of pregnancy. It is well known that the placental insufficiency can also determine a premature birth [3].

MATERIAL AND METHODS

The study has been carried on a 3 year period (2008-2010) at the Dental Office and at the Obstetrics and Gynecology Clinic of Craiova County Hospital. 4700 births and 1273 premature births have been registered over this period (431 in 2008, 392 in 2009 and 450 in 2010). Because of the constant rate of premature births that took place each year, we have analyzed the 450 premature births from 2010 and we excluded all the other possible factors implicated in the induction of premature birth. We have chosen 30 pregnant women with distinct and relevant oral and dental pathology. A screening for the dental plaque has been done, and measurements for the free calcium, blood C reactive protein and IL6 from the amniotic fluid sampled at birth and noted in the observation chart have also been done.

We have taken in consideration calcium as a possible cause of premature labor. We have ascertained the role of prostaglandins released in the inflammatory process of uterine and amniotic structures, prostaglandins that also trigger the uterine contractions. The marker for the inflammatory process is C reactive protein (CRP) that acts as a mediator between the tissue involved in the inflammatory process and the immune system. Usually we cannot measure CRP in the serum because its value is below 0,6 ng/dl. Another marker, IL 6 is synthesized by the T and B lymphocytes, by the endothelial and epithelial cells too and shows us the presence of an amniotic infection (normal values are around 11 ng/ml). The determinations for CRP and IL 6 have been done using the high sensitive Elisa method. The free calcium's values are

around 4.5-5.2 mg% and it is measured by chemically dosing total calcium and the plasmatic proteins (1g of protein binds 0.60-0.80 mg of calcium). The difference between total calcium and the calcium-binding proteins is represented by the free calcium.

RESULTS AND DISCUSSION

The determination of IL 6, CRP, calcium and other enzymatic and hormonal markers along performing a fetal ultrasound represents a part of the predictive materials of premature labor. The premature labor prediction and prevention remains a major problem in obstetrics.

The increased IL 6 level in the amniotic fluid represents a predictive marker of premature birth because it signals the amniotic infection (via oral and dental inflammatory process). IL 6 is a protein with a major role in the stimulation of the immune response to infections and tissue trauma being secreted by macrophages, monocytes and decidual cells. The pregnant women with positive cultures for pathogenic flora from the dental plaque can present a histologic chorioamnionitis (HCA) that can trigger the premature labor without any other clinical symptoms. 20ml amniotic fluid probes have been sampled from the pregnant women with inflammatory oral and dental processes (all of which have had premature births). The probes have been compared with the probes collected from 20 pregnant women with term births – 20ml have also been sampled from these patients after membrane rupture.

The Elisa method was used for all the determinations. The test sensitivity for the IL 6 is 11 ng/ml. The reading has been done using a spectrophotometer (Δ 480 nm). The results were stated in ng/ml by comparing the extinction of the samples taken, with the extinction of the sample that accompanies IL 6 standard test. We have obtained a high concentration of IL 6 in the samples taken from the pregnant women with premature rupture of the membranes and oral and dental inflammatory processes.

Table 1. IL 6 measurement on pregnant women

TEST	MEMBRANE RUPTURE TIME	IL 6 MEASUREMENT (AVG ±Std) n=20
Pregnant women with full term birth and no oral and dental inflammatory processes	2h	54± 3.40
Pregnant women with preterm birth and oral and dental inflammatory processes	2h	67±3.60
Student test		P< 0.001

According to Table 1, we have ascertained that pregnant women with premature birth and with oral and dental inflammatory processes have a concentration of IL 6 of 67.00 compared to the pregnant women with a full term birth and no oral and dental inflammatory processes who possessed a concentration of IL 6 of 54.00.

To test for germ presence in the amniotic fluid we have done a screening test on a gelose-blood medium (15 cm diameter). The pregnant women with oral and dental inflammatory processes and premature births have shown an increased number of bacterial colonies in comparison to the pregnant women who didn't manifest any oral and dental inflammatory processes.

The evaluation of the microbial invasion of the dental plaque

Each sample from the dental plaque has been screened on a gelose-blood medium with a diameter of 15cm with 1 ml waves. After 24 hours we have ascertained the presence of germ colonies.

The results have been stated as positive (+) or negative (-). A positive result means more than 10 colonies on the gelose-blood medium. We have ascertained the existence of 15-20 germ colonies in the samples taken from the pregnant women with premature birth risk and only 8-20 germ colonies in the samples taken from the pregnant women with no premature birth risk.

The free calcium implication in the initiation of premature labor

The plasma calcium concentration has been evaluated to 10,08 mg in the first trimester, 9,81 mg in the second trimester and 8,57 in the third pregnancy trimester. Usually calcium is found as calcium-binding protein. The free calcium fraction represents 4,5-5,2 mg%. All the measurements have been taken in Synevo laboratories.

Table 2. Free calcium measurement

PREGNANT WOMEN	VALUE	FREE CA (avg+std)
Dental cavities and premature birth risk	10	5.1 mg%
No dental cavities	10	4.8 mg%

Although there are few cases for a statistical analysis, only few cases that presented dental cavities and risk of premature birth had increased levels of free calcium as according to Table 2.

C Reactive Protein

Table 3. C Reactive Protein measurement

PREGNANT WOMEN	TOTAL (pregnant women)	TEST (avg+std)
With no risk of premature birth and no oral and dental inflammatory processes	15	5 ng/l
With risk of premature birth and with oral and dental inflammatory processes	15	11 ng/l

The phenomenon shows the presence of oral and dental inflammatory processes with a modified synthesis of prostaglandins from the utero-amniotic structures and the initiation of premature labor but fever and other metabolic changes can also be implicated.

CONCLUSIONS

- There's still a certain amount of incertitude regarding the etiology of premature birth that seems to be triggered by multiple factors.
- In our study we have concluded that the pathogenic flora established in the dental plaque is relevant for premature birth.
- The oral and dental inflammatory process can influence the utero-amniotic structures initiating the local synthesis of prostaglandins that can trigger the initiation of premature labor.
- The detection of a possible initiation in premature labor can be done by means of prediction methods: IL 6, CRP dosage shows the implication of the oral and dental inflammatory process in the synthesis of prostaglandins.
- Free calcium modified by salivary secretion and microbial action at mouth level is an important factor in the physiology of uterine contraction.
- From a clinical point of view, these positive prediction markers command taking measures to avoid triggering premature labor (by use of tocolitics: Utrogestan, Ginypral) and treating the pregnant patients for oral and dental conditions.

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Correspondence to:
Rîcă Radu
Feldioara 6, Craiova
Phone: 0755.074.644
E-mail: radu.rica@gmail.com
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COMPARATIVE STUDY ON THE IMPLEMENTATION OF A SYSTEM BASED ON HACCP PRINCIPLES IN BAKERY FACILITIES FROM DÂMBOVIȚA COUNTY

Vaszil C.[1], Vaszil R.[2]

1. Food Safety, D.S.V.S.A. Dâmbovița, Târgovişte
2. Public Health Control, D.S.P. Prahova, Ploieşti

REZUMAT

Studiul prezintă rezultatul implementării unui sistem HACCP în cazul a două unităţi de panificaţie din judeţul Dâmbovița, prin urmărirea modului de îmbunătăţire a condiţiilor de funcţionare (structură funcţională, amenajare, dotare), a condiţiilor igienico-sanitare şi a controlului exercitat în anumite etape ale activităţii de producţie având drept scop obţinerea de produse finite care să nu pună în pericol sănătatea consumatorilor. În ambele unităţi condiţiile respective s-au îmbunătăţit, iar produsele finite obţinute sunt sigure pentru consum.

Cuvinte cheie: *HACCP, condiţii de funcţionare, condiţii de igienă*

ABSTRACT

The study presents the result of a HACCP system implementation within two bakery facilities from Dâmbovița County, by tracking improvements in terms of functioning conditions (functional structure, arrangement and endowments), hygiene and sanitary conditions and the control exerted in various stages of the production activity with the purpose of obtaining end products that do not jeopardize consumers' health. With the system implemented conditions improved and end products obtained are safe to consume in both facilities.

Keywords: *HACCP, functioning conditions, hygiene conditions*

INTRODUCTION

Food safety is essential for the promotion of consumers' health. Quality and food safety involve the fulfillment of certain requirements, of rules for best practices in terms of hygiene and production and procedures to ensure that products' integrity [1]. A system that guarantees the hygienic and sanitary production of food is the system based on HACCP principles (hereinafter referred to as HACCP system). The system is based on preventing and reducing possible hazards (biological, physical and chemical agents) associated to the aliment and the production process which could generate risks for consumers [2,3]. Hazards are analyzed, by identifying those stages in the technological process that are critical for the innocuousness of the aliment (critical control points - CCP). The lack of control at these stages can lead to the

production of aliments that threaten the health or life of consumers [1-3]. The current study tracks the effects of the HACCP system implementation on the functioning conditions for two bakery facilities.

MATERIAL AND METHOD

Selection and description of participants
The two facilities included in the study are located in the Dâmbovița County. One of the facilities, built in 1972, located in the urban area, is owned by SC COMPAN SA and the other one, built in 2004 and located in the rural area, belongs to SC MARIOT BM COM SRL. Both facilities have been designed for bakery activities. The study period was 4.5 years, between the 1st of July 2005 and the 31st of December 2009. At the time the study was initiated, none of the facilities had a HACCP system implemented.

Technical information
In order to obtain the necessary data, the following stages have been completed within the study activity: the application of general questionnaires, the application of observation sheets and the application of a specific questionnaire for the assessment of the HACCP system.

A.The general questionnaires
Before the system implementation was initiated, an initial questionnaire has been applied in order to check whether the food safety legislation, the requirements regarding the structure and the endowments of the facilities, the hygiene and sanitary conditions that must be respected within these facilities, the quality and the safety of the end products obtained, the measures that must be taken in case of inconsistent products, the employees' level of training (regarding the hygiene and sanitary requirements and the application of a HACCP system), as well as the existence of complaints about the end products or the measures carried out are known.

In the period during which the system was elaborated intermediary questionnaires were applied in order to obtain data about the HACCP team, the CCP and critical limits setting, the monitoring and verification procedures and the recordings made. Changes and improvements upon the facility, the situation of the tests carried out and the measures taken in case of inconsistent products have also been tracked.

After the HACCP system was implemented, a final questionnaire was applied in order to obtain data regarding the changes brought to the HACCP plan and the procedures for the quality and safety of the end product (through lab tests results, the analysis of consumers' confidence and the analysis of the complaints formulated about the products made).
In case of all questionnaires applied, the answers came from the legal representatives of the companies, personnel with management responsibilities and the HACCP team leaders.

B. Facilities' observation sheets
During the entire study of the facilities, observations were made at time periods set in a way that will cover all stages (the lack of a HACCP system, the elaboration period, the implementation period) and facilityobservation sheets were compiled [4]. The following elements were tracked: the activity carried out within the facility, functioning conditions (areas, endowments, interiors), hygiene conditions, process control (including potential hazards control and the pursuit of several food hygiene control system aspects), the HACCP system (without further details which were observed in a specific questionnaire) and laboratory tests carried out in order to check the quality and safety of end products.

The aspects followed were noted for each observation sheet, according to a well-defined method.

C. Specific questionnaire for the assessment of the HACCP system

By applying this questionnaire one could observe whether the stages required for the application of the HACCP principles were followed (HACCP team, products made, the flux diagram, identification of hazards, characterization of hazards, control measures for the hazards identified, CCP and critical limits setting, monitoring system elements, corrective measures to be taken, compiling the documentation, methods to assess system functionality) [2,3,5].

The questionnaire was applied during the period of time when the HACCP system was implemented, capturing all stages completed by the facility, the correctness of their sequential application and the correspondence between the results obtained and the data planned.

Laboratory tests carried out by the facilities have also been monitored. The tests carried out within the facility were considered distinctively from the ones performed in an external laboratory.

Statistics

The situation of the two facilities has been comparatively analyzed at the beginning, during and at the end of the study. The results are presented in the tables and charts below. The analysis of raw materials, of the water used as an ingredient within the production process and the end-products obtained were performed in the laboratories of DSVSA Dâmboviţa, DSP Dâmboviţa, external laboratories, as well as the laboratories located within the facilities. The interpretation of results was made according to the technical specifications of the companies involved and the correspondent professional standards approved at a national level.

RESULTS

A.The following information resulted from the analysis of general questionnaires applied:

a) At the beginning of the study only SC MARIOT BM COM SRL demonstrated partial knowledge about the requirements in place, stipulated by national laws regarding the necessity of a HACCP system implementation and the hygiene conditions that must be applied in production facilities. The implementation was considered necessary in order to comply with the legislation. The requirements stipulated by the European legislation were not known. The hygiene conditions were considered to be fulfilled. The personnel were not trained regarding hygiene requirements. Laboratory tests for the physical-chemical analysis of end products were performed in laboratories within the facility. External physical-chemical and microbiological analyses were performed sporadically, but not as part of a self-control program. The technical specifications for end products were incomplete. There was no information whether the values for the parameters analyzed were appropriate. There was no information about previous inconsistencies regarding the end product.

b) During the study, the facilities went through the stages necessary in order to ensure the general and specific hygiene requirements, for the implementation of a HACCP system. They have achieved changes at the level of the functional structure, the creation of new areas, improvements and the acquisition of new equipment. Both facilities have elaborated and implemented HACCP systems. The elaboration was done using their own staff, based on the experience of their personnel with higher education (technological engineers hired within the facilities who have been appointed as HACCP team leaders). Self-control programs for the

quality and safety of the end product have been elaborated and applied, as well as training programs for the personnel within the facilities.

c) Following the implementation, the systems have been periodically checked. As a consequence, HACCP plans have been reviewed for both facilities. Actions aimed at improving functioning conditions take place continuously. Moreover, laboratory tests of end products (physical-chemical and microbiological) are carried out as part of the self-control program.

B. The following resulted from the analysis of the observation sheets (as seen in Tables 1 and 2, shown below):

a) Before the system was implemented the functioning conditions – figure 1 and 2 (the design and arrangement of the production and storage facilities, social / sanitary annexes, functional circuits, floors, walls, doors, windows, surfaces in contact with raw materials, semi-products, end products, tools, equipment) and hygiene conditions – figure 3 and 4 (the maintenance of areas, work surfaces, tools and equipment, sanitary installations, personnel's hygiene, waste management and pests control) of both facilities were inappropriate. Process control – figure 5 and 6 (control of hazards related to raw materials, hazards that can occur during the production process, control of factors favoring the development of micro-organisms, cross microbial contamination control, physical-chemical contamination control, control of stages from the technological processes of eliminating or reducing contaminants, fulfillment of requirements regarding raw materials, materials, packages and water used as an ingredient or for sanitation) was done incorrectly, incompletely and un-documented [6-9].

b) During the implementation period, the observation sheets compiled show a dynamic improvement in terms of scoring for both facilities, under all aspects considered (functioning conditions, hygiene conditions and process control).

c) After implementation, the situation is significantly changed. The entire activity (from the reception of raw materials until the delivery of end productsis strictly monitored). CCP are being monitored as well and corrective measures are applied, when necessary. Moreover, procedures are being followed and the functionality of the system is being checked and documented. The quality and safety of end products is also being checked accordingly.

Table 1. Results of periodical observations for SC COMPAN SA

Check no.	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
Date	Sep.05	Nov.05	Feb.06	May 06	Aug.06	Mar.07	Jun.07	Sep.07	Dec.07	Mar.08	Jul.08	Oct.08	Feb.09	Jul.09	Nov.09
Functioning conditions	3.11	3.59	5.77	6.72	7.57	8.6	8.8	8.9	8.5	8.28	8.72	8.9	8.9	8.95	9.05
Hygiene conditions	3.46	3.08	6.61	7.66	8.61	9.08	9.14	9.02	8.22	7.77	8.5	9.38	9.19	9.44	9.49
Process control	3.31	3.45	5.84	6.76	8.23	9.23	9.46	9.46	8.5	8.1	9.07	9.35	9.35	9.42	9.57

Table 2. Results of periodical observations for SC MARIOT BM COM SRL

Check no.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Date	Aug.05	Nov.05	Feb.06	Iun.06	Sep.06	Dec.06	Mar.07	Iun.07	Oct.07	Feb.08	Iun.08	Oct.08	Feb.09	Iun.09	Oct.09
Functioning conditions	5.37	5.37	8.45	9.12	9.39	9.35	9.35	9.22	9.18	9.25	9.37	9.37	9.47	9.47	9.47
Hygiene conditions	5.43	5.5	8.16	9.11	9.15	9.07	8.66	8.33	8.26	8.73	9.01	9.08	9.17	9.24	9.66
Process control	4.85	4.92	7.21	8.85	8.73	8.69	8.78	8.34	8.26	9.07	9.14	9.14	9.5	9.5	9.54

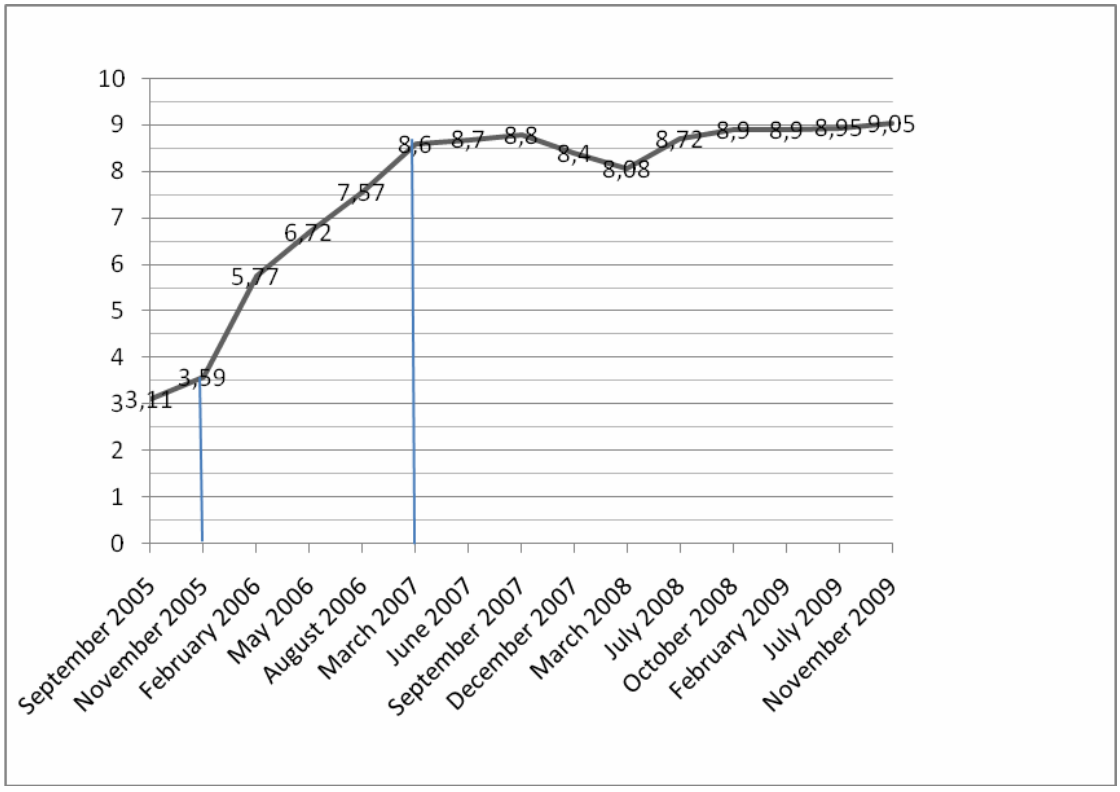

Figure 1. Facility functioning conditions for SC COMPAN SA

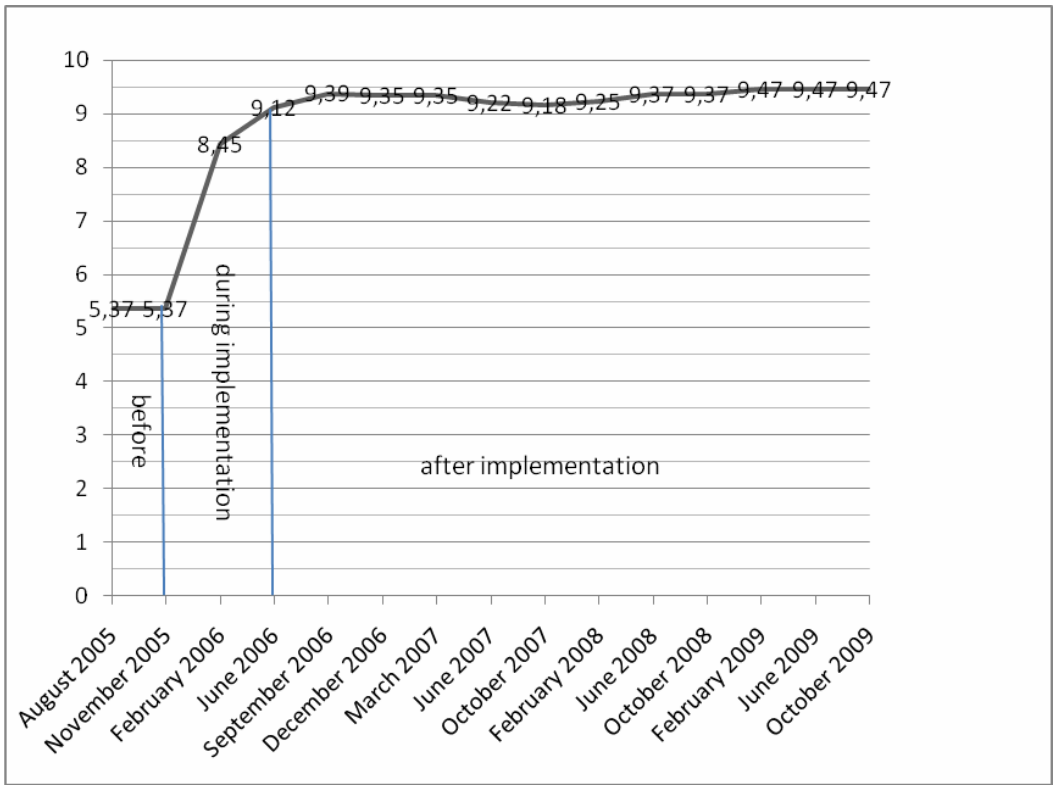

Figure 2. Facility functioning conditions for SC MARIOT BM COM SRL

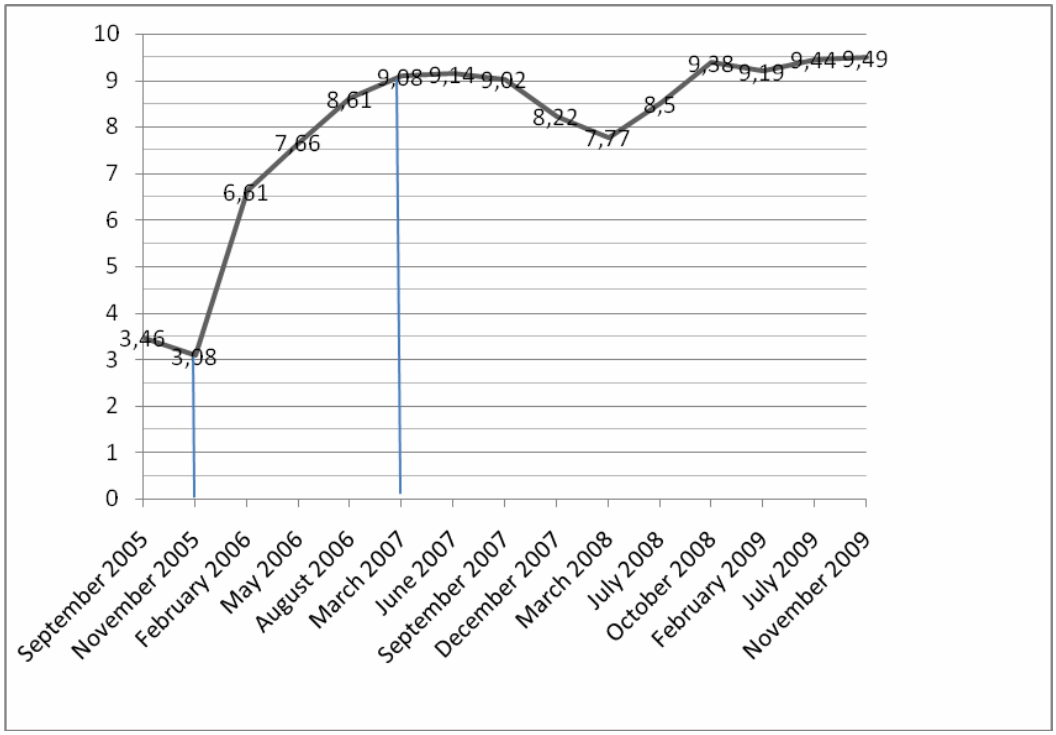

Figure 3. Hygiene conditions- SC COMPAN SA

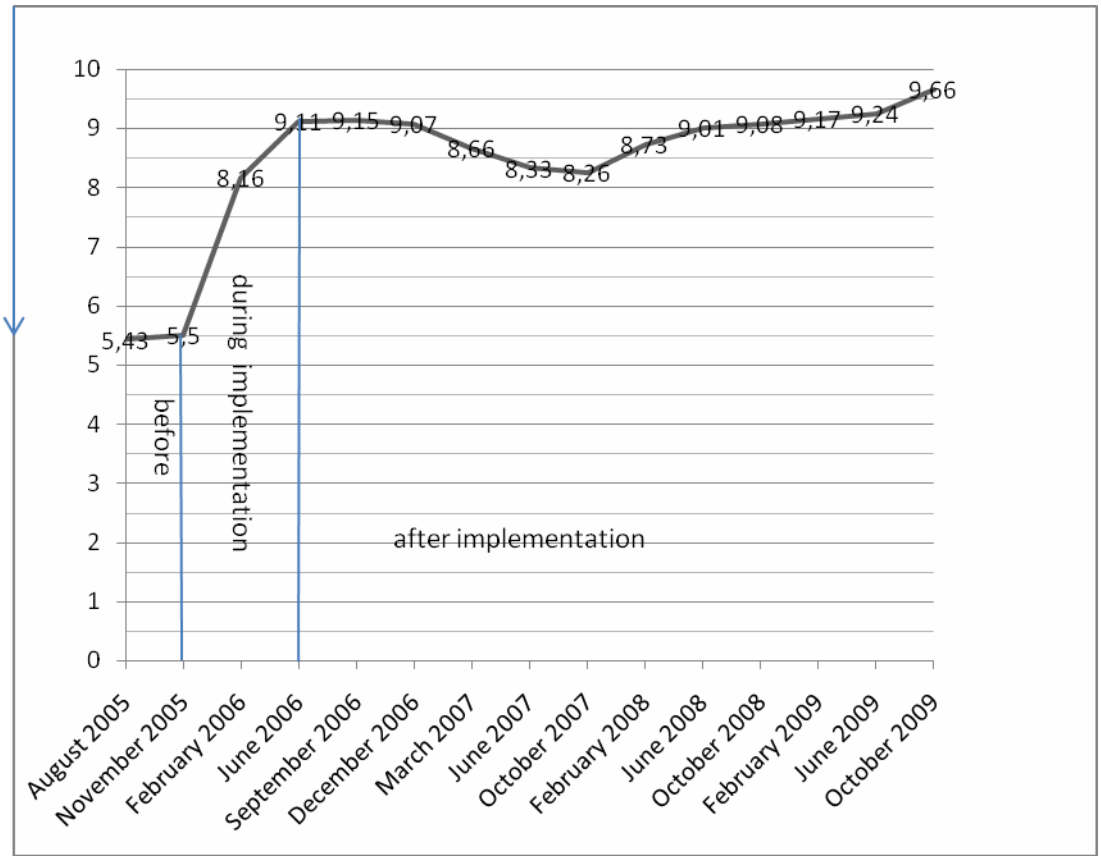

Figure 4. Hygiene conditions- SC MARIOT BM COM SRL

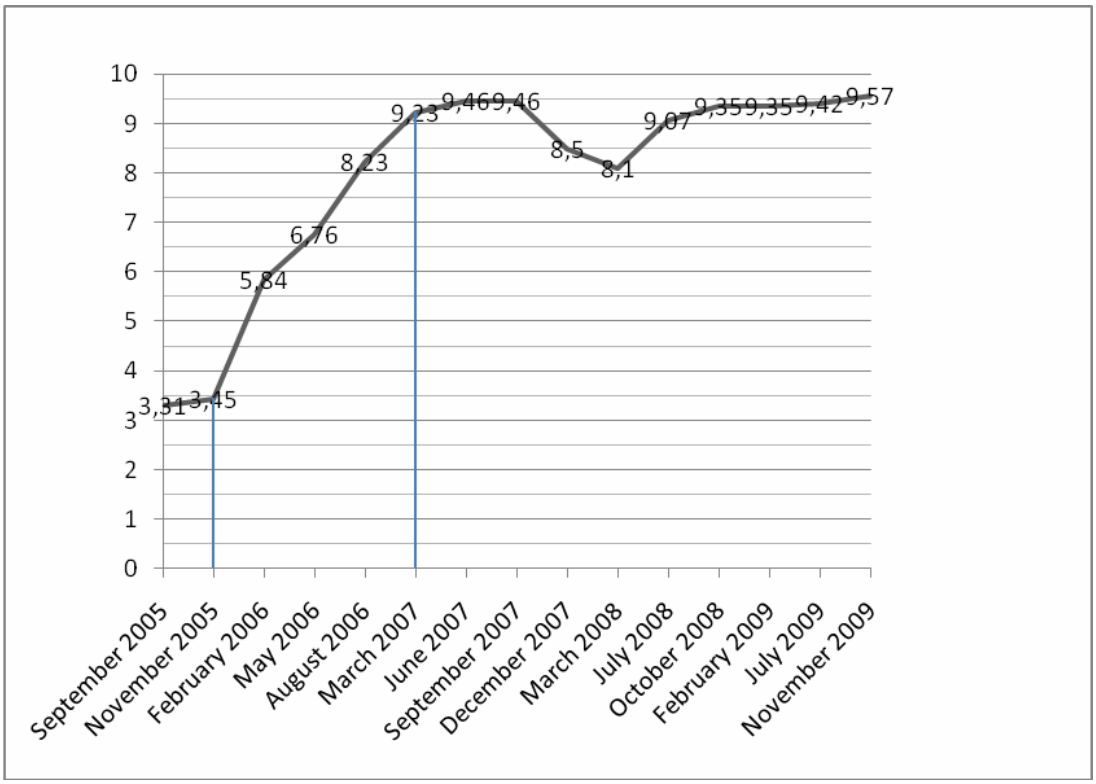

Figure 5. Process control- SC COMPAN SA

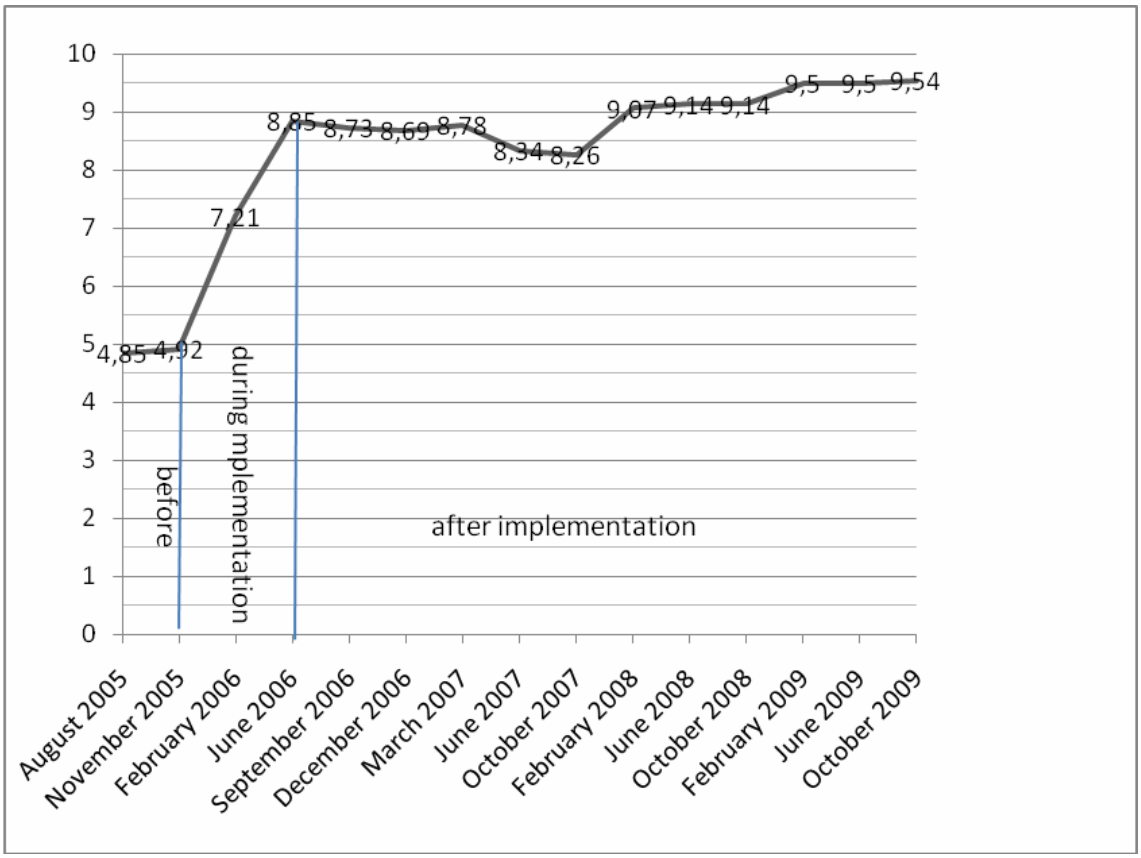

Figure 6. Process control- SC MARIOT BM COM SRL

C. The analysis of specific questionnaires regarding the verification of HACCP systems shows the completion of the stages needed in order to apply the principles of the HACCP method [1,6]. HACCP teams were formed, flux diagrams were elaborated and checked, potential hazards were identified and analyzed, the HACCP decision tree was applied, critical limits, monitoring systems and corrective measures for CCP were set, the functionality of the system was checked and the documentation method was established.

DISCUSSIONS

Smaller values on functioning conditions before the implementation of the HACCP system for SC COMPAN SA (average 3.35) are due to old and deteriorated surfaces, tools and equipment. In comparison, the facility owned by SC MARIOT BM COM SRL, although built more recently, has scored higher, but still low values (average 5.37), due do the lack of some areas and the inappropriate arrangement of the others.

The application of the questionnaires has shown, at the beginning of the study, a low level of awareness regarding hygiene requirements and the failure to comply with those requirements, in the case of SC COMPAN SA. In comparison, SC MARIOT BM COM SRL knew the requirements, but did not comply with them.

With the system implemented one can observe a fall in the scores of hygiene conditions for both facilities, for a limited amount of time, due to insufficiently trained personnel on issues such as hygiene requirements and the failure to comply with best hygiene practices.

The scores for process control show a similar decline due to the reduction of the rigor used to supervise and document the

aspects followed (especially the ones regarding the control of stages aimed at reducing contaminants, established as CCP or CP).

In the case of the facility owned by SC COMPAN SA the scores on the functioning conditions decreased, due to the fact that the refurbishment works were incorrectly done (the restoration was made without a previous thermo and hydro isolation of the walls). This led to an inappropriate condition of the areas used for production, during a period of low temperatures (December 2007 – March 2008). Furthermore, between October 2007 and March 2008, SC COMPAN SA went through repeated changes in the chain of command, and the lack of involvement of the managerial team in issues regarding functioning conditions reflected itself in the data collected.

CONCLUSIONS

The current study brings out the role of a HACCP system implementation within a production facility. This action requires the fulfillment of appropriate functioning conditions, the adequate training of the personnel and the involvement of managerial structures within the company. It also requires the elaboration of a system tailored on the specific conditions of each facility and an ulterior rigorous and continuous involvement in the fulfillment of activities. In the case of the facilities covered by the study, the implementation of the HACCP system improved the functioning conditions (structure, endowment) and applied a rigorous systematic supervision at the level of CCP, thus obtaining bakery products safe for consumers.

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Correspondence to:
Claudiu Vaszil
No. 4, Intrarea Castor Street,bl. G3, 2nd floor, ap. 11
Ploieşti, Prahova County
Phone: 0344115611, Cell: 0744587178
E-mail: vaszil_claudiu@yahoo.com
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INDOOR MICROBIAL ALLERGENS AND PREVENTION

Serban D.[1], Serban C.[2]

1."Victor Babes" University of Medicine and Pharmacy, Timisoara
2. Statistica Medicala Freelance, Timisoara

REZUMAT

Există numeroase tipuri de microorganisme cum ar fi: fungii, bacterii, mucegaiuri, alge şi protozoare despre care s-a dovedit că ar provoca reac□ii alergice la persoanele expuse. Dintre toate tipurile de microorganisme, fungii sunt cel mai frecvent incrimina□i în patologia alergică. Alergenii fungici difuza□i în aer sunt responsabili de rinita/conjunctivita alergică, astmul alergic □i pneumonita de hipersenzitivitate. Condi□iile favorabile cre□terii fungice se corelează pozitiv cu frecven□a simptomelor respiratorii, determinate prin chestionare. Expunerea la alergeni bacterieni a fost asociată cu apari□ia astmului profesional, pneumonita de hipersensibilizare, febra de expunere la umidificatoare ale aerului □i o patologie asemănătoare fungozei bronhopulmonare. Simptomele clasificate ca □i febra de expunere la umidificatoare ale aerului au fost atribuite aerosolilor bacterieni gram negativi. Acanthamoeba polyphaga □i Naegleria gruberi allergens sunt protozoare, iar expunerea la ele a fost asociate cu febra datorată aparatelor de umidificare □i cu astmul profesional. A fost raportat că expunerea la alge ar produce alergii mediate de Ig E.

Cuvinte cheie: *alergeni microbieni, calitatea aerului interior*

ABSTRACT

There are many types of microorganisms such as fungi, bacteria, algae and protozoa that have proven to cause allergic reactions in exposed individuals. Fungi are most commonly incriminated in allergic pathology. Disseminated fungal allergens in the air are responsible for allergic rhinitis / conjunctivitis, allergic asthma and allergic hypersensitivity pneumonitis. Conditions favorable to fungal growth is positively correlated with frequency of respiratory symptoms, as measured by questionnaires. Exposure to bacterial allergens was associated with occupational asthma, hypersensitivity pneumonitis, humidifier exposure fever, and broncho-pulmonary pathology similar to fungosis. The symptoms classified as exposure fever to humidifiers were attributed to gram negative bacterial aerosols. Acanthamoeba polyphaga and Naegleria Gruber are protozoa whose allergens were associated with fever due to humidifying devices and with professional asthma. It was reported that the exposure to algae would produce Ig E-mediated allergy.

Keywords: *microbial allergens, indoor air quality*

INTRODUCTION

The bacterial analysis of air allows the assessment of air quality, on which we can establish a set of measures for the prevention of airborne infections, which have a considerable share in infectious pathology.

The air is an environment in which microorganisms do not multiply due to lack of nutrients. Microorganisms that pollute the air are from soil, water, plants, animals and humans sources, but also from various human activities. Therefore, the atmospheric air microflora of indoor and outdoor spaces differs substantially, both qualitative and quantitative. The outdoor microflora is richer in summer and reduced in winter, while in indoor during winter several classes of pathogens are detected, but in summer the number of detected pathogens is reduced.

Microbiological analysis of air involves the study of microbial species diversity, and quantification of microbiological indicators.

Determination of the air quality in enclosed spaces is based on the concentration of microbiological indicators as streptococci, staphylococci and α-and β-hemolytic, and the total number of organisms per cubic meter of air.

In surgical clinics, maternity hospitals, dental clinics and other medical institutions, the potential pathogenic flora often causing nosocomial infections (Pseudomonas, Klebsiella, Proteus) is currently determined. The air in operating rooms, postoperative wards, dental offices, dressing rooms, intensive care wards, delivery rooms, postnatal wards and places of mass concentration of the population such as schools, cinemas, gyms, etc.. is examined. In Tables 1 and 2 are set microbiological criteria for assessing the indoor air and treatment institutions.

Table 1. Criteria of evaluation of indoor air

Indicators	Summer		Winter	
	Sterile	**Non-sterile**	**Sterile**	**Non-sterile**
NTG for $1m^3$	≤1500	≥2500	≤4500	≥7000
Streptococccus for $1m^3$	<16	<36	<36	<124

Table 2. Apreciation of air quality in treatment clinics

Space	Activity	NTG for 1 m^3	Addmited concentration for 1 m^3	
			Stafilococcus	**Streptococcus**
Operation room	Until surgery After surgery	<500 <1000	- -	- -
Postoperative rooms		<750	-	-
Intensive care unit		<750	-	-
Labor room	At the beginning of labor	<1500	-	-
Post-labor rooms		<2000	Up to 16	
New-born rooms		<1500	Up to 12	
Treatment room	Until the treatment	<750	-	-
Regular hospital	Summer	<3500	<24	<16

room	Winter	<5000	<52	<36

It is estimated that approximately one third of all health inconvenience are caused by poor indoor air quality due to microbial and fungal contamination [1].

Microbial and fungal contamination of indoor air has many adverse health effects on the exposed individuals [2]. Many species of fungi and bacteria can cause infections. They can also release metabolic products such as volatile organic compounds, microbial endotoxins, fungal glucans and mycotoxins. Fungi or some of their by products can trigger asthma due to their allergens properties. Fungal glucans cause lung inflammation and their production has been associated with existence of headaches. Mycotoxins have health effects, especially through ingestion exposure. Gram negative bacteria produce endotoxins which have a wide range of health effects from mild fever and flu-like symptoms to death in high exposure [3].

MICROBIAL ALLERGENS

There are many types of microorganisms such as fungi, bacteria, algae and protozoa that have proven to cause allergic reactions in exposed individuals.

• *FUNGI*

Fungi are eukaryotic organisms with rigid cell wall that are found in containers whith humidity ranging from minimum moisture to continuously wet. Fungi are in constant competition with bacteria for nutrients and oxygen. They can grow at a low pH level and can kill and inhibit growth of many bacteria through the excretion of metabolic products (antibiotics).

Any organic material can be totally degraded by any strains of fungus, if a sufficient quantity of water is provided. Fungi digest their food externally, excreting the enzymes in the environment. Some fungi can change their secretion depending on the type of food or the environmental conditions.

Sources and dissemination

Fungi are ubiquitous outdoors, growing on living or dead plants, animals and other organisms. Inside the buildings fungi grow in damp environments such as basements or shower booths [4]. Aspergillius and Penicillinum species are often dominant indoors. Some fungi (Aspergillus versicolor, A. flavus, Wallemia sebi) prefer relatively dry environments and begin to grow on substrates containing 65% water [5]. The humidity at which hygroscopic materials from dust (including exfoliated human skin) absorb enough water to support growth of these xenophile fungi is unknown, but is estimated to be around 60 – 70%.

Other substrates used by fungi could be: ureic formaldehyde from insulation foam, wicker baskets, mats in the bathroom [6,7]. Fungal spores and other products of their metabolism rises into the air due to air movement caused by human normal activities [8]. Contaminated air conditioners and humidifiers are actively spreading spores and spores allergens dissolved in the air [8]. The aerosol content in particles derived from fungal sources depends on the abundance and size of sources, but also by factors of dissemination, mixing, dilution and removal of particles. Natural aerosols are mostly composed of mixed species. In agriculture and in disseminated active closed spaces, aerosols may be monospecific, containing particles derived from a species of fungi, increasing the risk of exposure to toxins and allergens specific to a specie and thus increase the risk of hypersensitivity pneumonitis. Massive exposure to toxin producing fungi accurs when handling contaminated organic material. This exposure may exacerbate both allergic pathology and direct toxic effects such as immune suppression and cancer [8].

There are no data available about the dose-response for fungal allergens.

Pathology

Among all types of microorganisms, fungi are most commonly incriminated in allergic pathology. Disseminated fungal allergens in the air are responsible for allergic rhinitis / conjunctivitis, allergic asthma and allergic hypersensitivity pneumonitis. Some fungi grow as saprophytes on pulmonary mucosa of patients with aspergilla allergies and allergic fungal sinusitis. Moreover, conditions favorable to fungal growth is positively correlated with frequency of respiratory symptoms, as measured by questionnaires [9,10].

It is possible that all fungi could produce allergens that are causing disease in subsequent exposures, although the results of susceptibility testing vary with the sources of allergens and populations selected for the study. Among individuals tested for the determination of respiratory atopic disease, between 1 -10% had positive skin tests to one or more fungal allergens [11,12]. In atopic populations, the percentage of positive tests can be up to 27% [13]. Skin reactions to fungal allergens in atopic asthmatic patients are positive for 70% of the participants. Investigators have measured the titers of IG precipitate specific for soluble species of Aspergillus, Penicillium, Paecilomyces [12], Pleurotus ostreatus şi Leucogyrophana pinastri [13]. These antibodies correlate with high level exposures to small fungal particles but diseases such as allergic bronchopulmonary aspergilioza and allergic fungal sinusitis requires the presence of host-specific factors that are unknown at this time. In allergic bronchopulmonary aspergilioza, exposure to allergens released by fungi that grow on the mucosa of the lung stimulates both IgE and IgG production. The relationship between exposure to airborne spores and allergic bronchopulmonary aspergiliosis initiation is unclear.

The nature of allergens

Fungal allergens may be structural parts of the microbial cell or the microbial cell can be produced and released into the environment. Fungal allergens isolated so far are soluble glycoproteins, some of which are enzymes or high molecular weight glycoproteins [13].

Native fungal extracts are complex mixtures of soluble materials like mycelium structures and cell walls, cytoplasm and metabolites. These extracts are produced by fungal growth in liquid medium in 5-15 days. The mixture is then mixed and filtered. Sometimes, fungal oil are extracted from their environment by filtering and then dried.

• BACTERIA

Bacteria are prokaryotic microorganisms with completely different structure that differs dramatically from that of fungal cells, plants or animals. They are usually unicellular and reproduce by simple division. Most bacteria are saprophytic and requires a complex source of carbon compounds. Bacteria degrade both aerobically and anaerobically substrate. In general bacteria require more water for active growth than fungi and are the dominant microorganisms in water tanks with a pH above 7. Some bacteria form spores that are resistant to extreme environmental conditions. Many organic substrates can be degraded by bacteria that form biofilms on surfaces that are constantly wet. Biofilms in ecosystems also support the growth of algae, protozoa and fungi. Bacteria are classified according to cell type, staining properties, spores production, metabolic characteristics and human pathology [14].

Sources and dissemination

Bacteria are found in many reservoirs, both indoor and outdoor. Often, gram-negative bacteria predominate in the reservoir tanks

located outside the leaf surface and can survive freely in the air for short periods of time. In soil and water a wide variety of bacteria can be found. Some species of Bacillus and thermophile actinomicetes (Faenia rectivirtigula, Thermoactinomyces spp.) will grow only at temperatures between 45 and 60°C. These species can be found in warm environments when exposed to sunlight, geothermal or self-heating conditions [15].

Bacteria from the outdoor get into air due to substrates movements – air movements, rain, and human activity. Indoor tanks which allow bacterial growth and dissemination include appliances such as humidifiers, organic materials stored inside, and cooling fluids. Bacillus species tend to accumulate in house dust. Termophilic microorganisms occupy the internal tanks of humidifiers attached to heating systems, the draining systems of refrigerators, dryers, ond other places characterized by the presence of organic materials, water and high temperatures. Air movements, human activity, handling of contaminated materials contribute to the dissemination of bacteria inside buildings [16].

As for fungi, bacterial aerosol composition and density depend on the abundance of sources and the release factors that act directly on factors such as aerosol mixing, dilution and removal of particles. Usually in the outside bacterial aerosols species of gram negative bacteria such as Pseudomonas are dominant. Aerosol sources close to cooling towers that contain Legionella pneumophila, microorganism incriminated in Legionnaires disease. Indoors, where the external sources are lacking, bacterial aerosols are composed mainly of gram positive cocci, commensals of human skin tissue and respiratory tract infections [17]. When gram negative microorganisms are dominant in indoor spaces is assumed they came from outdoor sources. High concentrations of bacteria are a risk of sensitization and trigger allergic reactions in humans.

Pathology

Exposure to bacterial allergens was associated with occupational asthma, hypersensitivity pneumonitis, humidifier exposure fever, and broncho-pulmonary pathology similar to fungosis. The symptoms classified as exposure fever to humidifiers were attributed to gram negative bacterial aerosols, although it is unclear whether the pathology is due solely to endotoxin exposure or exposure to endotoxin in conjunction other allergens [18]. Endotoxin causes some symptoms related to infection (fever, chills).

The same as fungi, bacteria secrete enzymes that act as allergens, and these enzymes can be found in many locations and products. For example, some Bacillus species are used for the productions of proteases that are added to laundry detergents. When first introduced, the aerosols of these enzymes have been implicated in outbreaks of hypersensitivity pneumonitis in workers involved in the manufacturing of these detergents. Enzymes of gram positive bacilli and the spores of thermophilic actinimycetes were involved in outbreaks of hypersensitivity pneumonitis and occupational asthma [19,20].

The nature of allergens

Native extracts of thermophilic actinomycetes that are usually associated with hypersensitivity pneumonitis are produced in a manner similar to extracts of fungi. They are used in tests of double infusion to assess the presence or absence of specific IgG antibodies (precipitines).

• PROTOZOA

Protozoa are microscopic animals that occupy similar reservoirs of bacteria. Intact protozoa are too large to remain in the air for long periods, although they sometimes cause infections of the eye or brain when

they reach the eyes or upper respiratory drops (such as those produced during bathing in the tub) . Some protozoa of inner water tanks excrete material that becomes airborne allergens that are attached to drops. Acanthamoeba polyphaga and Naegleria Gruber allergens were associated with fever due to humidifying devices and with professional asthma [19].

• ***ALGAE***

Algae are plant-like organisms that have rigid cell walls and cellulose structure; can be found predominantly in aquatic environments. It was reported that the algae would produce Ig E-mediated allergy [18].

PREVENTION

To prevent bacterial contamination of indoor air by aerosol, the penetration from the outside should be reduced. Maintaining a physical limits boundary between interior and exterior environments by closing doors and windows and use of mechanical ventilation and air conditioning systems are effective ways to prevent contamination. Water accumulation should not be allowed, especially in ventilation systems. Relative humidity should be maintained at 60% to prevent water adsorption by hygroscopic materials and avoid condensation on cold surfaces. The effectiveness and usefulness of biocides, are used on surfaces or incorporated in various fabrics or materials has not been clearly established [20].

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Correspondence to:
Denis Serban
"Victor Babes" University of Medicine and Pharmacy
16 Victor Babes street, Timisoara
Phone: 0723169089
E-mail: denis.serban@umft.ro
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EFFECTS ON HEALTH OF INDOOR FUNGI

Rădulescu M., Licker M., Berceanu Văduva D., Crăciunescu M., Hogea E., Dugăeşescu D., Dragomirescu L., Piluț C., Muntean D., Moldovan R.

"Victor Babeş" University of Medicine and Pharmacy Timişoara

REZUMAT

Fungii sunt ubicuitari □i sunt primele microorganisme care pot trăi în condi□ii de mediu extreme. Prezen□a lor în aerul din interiorul încăperilor în concentra□ii crescute poate reprezenta un pericol pentru cei care locuiesc sau î□i desfă□oară activitatea acolo, întrucât calitatea aerului poate avea efecte asupra sănătă□ii organismului pentru cei care locuiesc sau muncesc în aceste clădiri. Umezeala mediului interior determină colonizarea cu fungi □i contaminarea aerului. Fungii □i umezeala din interiorul clădirilor reprezintă un factor important în ceea ce prive□te sănătatea. Cu un asemenea mediu înconjurător este necesară investigarea regulată a aerului din interiorul locuin□elor.

Cuvinte cheie: *fungi, sănătate, clădiri, interior.*

ABSTRACT

Fungi are ubiquitous and are the first organisms able to live in extreme environmental conditions. Their presence in high concentrations in the indoor air is a high risk factor for people living or working in those interiors, since the quality of the air has a strong effect on the health of these individuals. The moisture in the environment determines fungi colonization and air contamination, therefore fungi and moisture inside buildings are a key factor in health issues. In cases of damp environments it is mandatory to regularly investigate the quality of the air inside buildings and dwellings.

Keywords: *fungi, health, buildings, indoor*

INTRODUCTION

Fungi are a diverse group of eukaryotic microorganisms. Widely spread in nature, only a part of them constitute the commensal flora of the human body. Most fungi are saprophytic and live on dead organic matter [1].

Although over 100 000 species have been identified, less than 100 of them are involved in the etiology of human infections, called mycoses. More frequently, mycoses appear opportunistically in patients with impaired immune function, such as patients with bone marrow transplant, with neutropaenia, neoplastic patients or HIV positive patients [2].

Fungi can be saprophytic, commensal or parasite, and can determine infections either through exogenous or endogenous pathways. They are ubiquitous in nature and are found on the soil, in water, in organic waste etc. In recent years, public attention has focused more and more on the problems raised by moulds present inside both dwellings and workplaces, as well as on the dangers of exposure to moulds.

Fungi contaminated air had negative effects on human health, as confirmed by numerous findings in medical literature. Exposure to air contaminated with indoor moulds frequently raises threats to human health, causing lesions and dysfunction in many organs and systems, including the respiratory, nervous, immune, circulatory and skin systems. Indoor moulds are also a common cause for life-threatening systemic infections in patients with impaired immune function.
Fungi are found in both indoor and outdoor environments. Moulds are usually spread through airborne spores. In order to grow, moulds and mould spores need moisture and a source of food, such as cellulose or decaying food. In the presence of water, mould spores inflate and grow, branching threads called hyphae, which secrete mycotoxins and digestive enzymes. The mould then digests the food source to sustain its own growth.

Approximately 100 000 species of fungi have been identified; in fact, it is estimated that fungi represent an amazing percentage of 25% of the global biomass. Currently there are no official standards for the concentration of indoor airborne fungi. However, a level above 150 to 1 000 colony-forming units per cubic meter (CFU/m^3) is considered health-threatening. Numerous reports have shown that indoor air can frequently be contaminated with mould spores in levels well over 1 000 CFU/m^3. Most fungi from the moulds class isolated inside buildings are *Cladosporium, Aspergillus* and *Penicillium*. Species of *Alternaria, Stachybotrys, Rhizopus, Mucor, Wallemia, Trichoderma, Sacharomyces cerevisiae, Botrytis, Epicoccum* and *Fusarium* are also frequent indoors [3].

INDOOR AIR QUALITY AND FUNGAL SAMPLE COLLECTION

Most of us spend approximately 90% of our time indoors; therefore the quality of the air we breathe is important. Concerns regarding health problems caused by fungi, as well as the allergic reactions caused by spore inhalation determine some persons to hire professionals to evaluate the quality of the air inside their houses.

Air sample collection implies forcing the entry of a known air volume through a probe in a device containing a Petri dish with a culture medium for fungi. This medium determines fungal growth. Other methods collect spores in a trap-like device where they can be counted, but cannot germinate or grow.

The concentration of outdoor spores depends on season and climate. Thus, they reach the lowest level between the months of December-February, and the maximum level is recorded from August to October.

Sources of spore invasion of the indoors are:
- open windows and doors,
- clothes
- pets.

Fungi that grow and produce spores indoors are associated with excess moisture. Dull smells, dampness, water leakage, high levels of moisture and visible mould all indicate an indoor fungi growth.

When analyzing the quality of air in a room, both indoor and outdoor determinations are carried out. Two sets of results can be obtained from an air sample: spore concentration, and types of spores.

The concentration of spores in the air is usually expressed in colony-forming units per cubic meter (CFU/m^3). The sample from the collecting dish is studied for 10-15 minutes. The number of appearing colonies is expressed as number of viable spores in that specific air volume. This result describes the quality of air during the 3-5 minutes of sample collection. The spore concentration can vary according to the time of day and location in the house, just as the result of the sample is merely the measurement of spore concentration at a certain time in that particular location. Activities undergoing in the house will increase spore concentration (i.e.: walking on carpets).

The second set of data identifies each spore and assigns it to the class and species it belongs to. Viable spore cultures produce spores called conidia. Studying conidia under an optical microscope can supply information regarding the genus and sometimes species they belong to. The most frequent genus of moulds found in air samples are: *Penicillium, Cladosporium* and *Aspergillus.* Other moulds often reported are those of the *Alternaria, Stachybotryus, Aureobasidium, Chaetomium, Epicoccum* and *Ulocladium* genus [4,5].

Many species of fungi are known to cause allergies. These include Alternaria and some species of *Penicillium* and *Aspergillus*. The significance of a high degree exposure depends on interpretation. The concentration in CFU/m^3 can vary greatly during repetitive determinations in the same spot. A high concentration of indoor spores indicates a serious health issue in that dwelling.

As *Penicillium* and *Aspergillus* spores have the same shape and size, they are often reported as *Penicillium/Aspergillus*. The two can be distinguished only though optical microscope study of the culture. The *Penicillium* genus contains approximately 223 species, while *Aspergillus* contains 185. Therefore, identifying spore genus and species is no easy task, requiring considerable time and expertise.

While some species are associated with certain diseases and allergies, some are not. High levels of *Penicillium* have been associated with the development of asthma in children, although the particular effect of each species has not yet been established. Thus, a high concentration in the air does not necessarily indicate a prerequisite for disease. *Aspergillus*, like *Penicillium*, contains some species that are known to cause disease, while some do not. *Aspergillus fumigatus* causes pulmonary infections in persons with impaired immune function, while healthy individuals are not affected. Likewise, a high level of *Aspergillus* does not indicate an exposure risk [6-8].

Other types of spores are sometimes reported in samples of commercial determinations: basidiospores, rusts, smuts and others. These are non-matrix fungi and can be found outdoors, reflecting the quality of the air. High concentrations of indoor basidiospores usually reflect the decaying the wood in the house, as many basidiomycetes are wood-decaying fungi. Very little is known of diseases caused by the inhalation of basidiomycetes, although several species have been found in fragments of infected pulmonary tissue sampled during the autopsy of patients with impaired immune function.

Another approach to the study of indoor air quality is to monitor the levels of moisture in the building materials and inside the house. High levels of moisture indicate there are suitable conditions for the growth of fungi or wood-decaying fungi. Identifying and eliminating the source of excess water or extreme humidity is probably the most important step we can take to improve the quality of air inside our houses.

MECHANISMS OF FUNGAL EFFECTS ON HEALTH

Fungi can exert negative effects on health by means of three mechanisms: infection, allergy and toxicity. Severe infections caused by fungi such as *Candida, Aspergillus* and *Pneumocystis* are common and many appear in patients with impaired immune function.

Fungi of the *Candida, Histoplasma, Cryptococcus, Blastomyces* and *Coccidioides* genus can cause disease in patients with unimpaired immunity. Fungi of the *Trichophyton, Candida* and *Malasezia* genus usually cause minor skin infections in patients with impaired immune function. At least 70 allergens have been thoroughly classified based on presence of spores, vegetative forms and small particles (0.3 microns and smaller). Allergies caused by fungi are very common.

A revisited version of 17 specialty studies pointed out that 6-10% of the general population and 15-50% of the genetically predisposed population has an immediate skin sensitivity to fungi[9]. These produce a wide array of toxic substances called mycotoxins. Common mycotoxins include:
- aflatoxins: very strong carcinogens, and hepatotoxins produced by some *Aspergillus* species;
- ochratoxins: nephrotoxic and carcinogen, they are produced by some *Aspergillus* and *Penicillium* species;
- sterigmatocystin: a substance that suppresses the immune system and is carcinogen for the liver, produced by species of *Aspergillus*, especially *A. multicolor*;
- tridchothecenes: especially produced by species of *Stachybotrys* and *Fusarium*, they have been reported to inhibit protein synthesis and to cause hemorrhage and emesis.

Fungi also produce beta-glucans with immunologic effects. The smell of moulds is mainly due to their volatile organic compounds. Food contaminated by mycotoxins has side effects on people and animals that have been recognized since the beginning of the 20th century[10].
Patients exposed to indoor *Stachybotrys* displayed measurable levels of the stacilisin hemorrhagic toxin.

EFFECTS OF EXPOSURE TO INDOOR MOULDS

Respiratory side effects

Many epidemiologic studies have mentioned that domestic exposure to moulds and/or moisture can increase the incidence and morbidity of asthma or difficult breathing, in both children and adults. Asthma and asthma-related states are very common in all age groups. Long-term exposure to fungi has been associated with a higher incidence of breathing difficulty, coughing and respiratory conditions.

High levels of indoor beta-glucans have been associated with significantly higher levels of chest tightness and joint pain. Professional exposure to moulds has been reported to significantly increase the incidence of asthma, sinusitis, skin and eye irritation and chronic fatigue. Higher concentrations of outdoor fungi are believed to be closely linked to higher asthma death rates, and with higher incidence of asthma in children and youth [11,12].

Exposure to moulds in the air can cause sinusitis, bronchopulmonary aspergillosis, and hypersensitivity to pneumonia. Fungal allergic sinusitis has been diagnosed based on the increase of mould concentrations from nasal secretions.

Methods used to reduce exposure to fungi (for example, by using air filters, ionizing devices, humidity control systems and nasal antimicrobial sprays) have significantly reduced rhino sinusitis and have improved the morphology of the nasal lining.

Immune alterations

Exposure to fungi can alter immune parameters. Some studies have shown that patients exposed to indoor fungi have higher serological levels of IgG, IgA and IgM antibodies against common fungi, of trichotecenes and satratoxins.

Exposure to indoor fungi had been associated with modified levels of T4, T8 and NK cells, and with higher levels of auto antibodies. Exposure to indoor glucans has been associated with a smaller proportion of cytotoxic T cells and a higher tumor necrosis secretion factor than in households with lower levels of beta-glucans.

Studies of cellular lines (culture cells that can proliferate infinitely if grown on a fresh medium and in adequate spaces) have revealed that many indoor mould mycotoxins can suppress T and B cells and the activity of NK cells. Therefore, exposure to airborne mycotoxins is believed to cause damaging side effects on the immune system [13].

Neurologic dysfunction

Exposure to airborne indoor moulds causes neurological dysfunction and cognitive deficit. Some of these include boreal symptoms and weakness, neurocognitive dysfunction including memory loss, irritability, anxiety and depressions, numbness, tingling and tremor. These signs and symptoms are classic manifestations of neurotoxicity.

Fungal effects are also registered in neuropsychiatric tests that include balance, blinking reflex, color perception, reaction time and left had clasp.

Significantly weaker results are registered in attention tests, balance, reaction time, verbal memory, focus, memory and rhythmical movement of fingers [14,15].

Numerous neuropsychological objective studies of symptomatic patients strengthen the idea that exposure to indoor moulds can have side effects of human health.

Kidney dysfunction

Long term exposure to fungi can also cause kidney dysfunction. It is well-known that food contaminated with ochratoxins is nephrotoxic. Exposure to indoor ochratoxins can also be nephrotoxic.

Potentially lethal fungal infections

Recent years have seen an increase in the incidence of life-threatening infections caused by Aspergillus or other moulds in patients with impaired immune function. Invasive aspergillosis is very common in patients with impaired immune function, most frequently because of pulmonary transplant, bone marrow transplant, acute leukemia and heart transplant. Even when strong fungicides are used and intense hospital treatments are followed through, invasive aspergillosis death rates vary between 50-99% in patients with impaired immune function. Controlling environmental factors is crucial for the prevention of Aspergillus infections. It has been proven that attempts to control the environment, such as HEPA filters, room sealing, regular cleaning and using fungicide paint with 8, Copper quinolate significantly reduce the level of Aspergillus in the air and the rates of invasive aspergillosis in hospitalized patients with impaired immune function [16]. Another recent research has shown that large amounts of Aspergillus spores can be disseminated through the water sewage systems, and that efficient disinfection of showers can lead to a dramatic drop of Aspergillus sp.

FINAL THOUGHT

It is obvious that fungi are part of the indoor air mycoflora, and therefore it is necessary

to interest people in the risks they are exposed to.

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Correspondence to:
Rădulescu Matilda
Address: Liviu Rebreanu 2/1, Timişoara
Phone: 0722465229
E-mail: matilda.radulescu@gmail.com
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