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MEDICUS

No. 4, issue 2/2020
JOURNAL OF THE FACULTY OF MEDICAL TECHNICAL SCIENCES

ISSN 2663-7758

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The journal has been catalogued at the National Library of Albania and the Library of the European University of Tirana, Albania.

(print ISSN: 2663-7758/ online ISSN: 2958-8871)

medicus@uet.edu.al

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UETPRESS

Published by:
EUROPEAN UNIVERSITY OF TIRANA / ALBANIA

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The epidemiological situation of HIV/AIDS in Albania

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Abstract

Introduction

HIV infection continues to be a global public health problem, despite advances in HIV prevention, diagnosis, treatment and care. Data from the UNAIDS report, 2020, estimates that in 2019, globally 38 million people were living with HIV and 690,000 people died of AIDS. The European HIV/AIDS Surveillance, 2019, shows that the number of new HIV cases has increased and HIV infection remains a problem in the European region as well. Epidemiological data of the Institute of Public Health, in Albania 2019, report 1298 cases of HIV infection with an increasing trend of cases.

Purpose

Analysis and assessment of the epidemiological situation of HIV / AIDS in Albania, for the cumulative period, 1993 - November 2019.

Method

Presentation and analysis of cumulative national data (1993- November 2019) of HIV positive cases, provided in different populations: clinic suspects, blood

donors, volunteers with HIV risk behaviors, HIV vulnerable groups, persons transfused, pregnant women and persons seeking testing for the visa application / documents.

Results

HIV/AIDS cases by 2019, were 1298, with low prevalence of HIV infection in the general population (0.046%). In 2019 (until November 2019), the number of HIV cases is 93. Most of the total cases are from urban areas (72.6%). The sexual route of transmission is reported in 95% of cases, while vertical transmission, from infected mother to child is 2.8% of the total (36 cases). HIV is more prevalent in males (72%), with an increased trend of cases diagnosed in males having sex with males / MSM. The distribution of HIV positive cases by age group shows that the age group 35-44 years (29.8%) predominates, while children 0-15 years presents 3.5% of the cases. The total number of HIV-positive children is 45.

Conclusions and recommendations

Although with an increasing trend of diagnosed cases, Albania remains a country with a low prevalence of HIV infection. HIV infection still remains an urban phenomenon, with a predominance of the sexual route of transmission. The most affected group by HIV / AIDS is 25-45 years old, although it is present at all ages. The stigma of discrimination against HIV-positive people remains one of the main barriers to HIV testing and for the low number of voluntary tests. Careful monitoring of HIV / AIDS, and strengthening of HIV prevention programs is needed, especially in key high-risk populations. Intensifying work to continuously inform the population about HIV / AIDS, promoting routine examinations and promoting voluntary testing, should be basic strategies for HIV prevention.

Keywords: HIV / AIDS, epidemiology, HIV positive, prevalence, voluntary testing

INTRODUCTION

HIV continues to be one of the leading global public health problems. However, with increasing access to HIV prevention, diagnosis, treatment and care, HIV infection has become a chronic health condition, enabling people living with HIV to live long and healthy lives¹.

From the data of the 2020 UNAIDS report on the global AIDS epidemic, it is estimated that in 2019 globally: 38 million people were living with HIV; 1.7 million

people became infected with HIV; 690,000 people died of AIDS. Also, since the beginning of the epidemic, about 75.7 million people have been infected with HIV and 32.7 million people have died of AIDS, and according to projections, AIDS will continue to be one of the leading causes of premature death in the coming decades².

Results from the European HIV/AIDS Survey, 2019, showed that the number of new HIV cases has increased by 19% in the last decade, and that HIV infection remains a major health problem also in the European region³.

In the last decade, significant progress has been made towards the achievement of the Millennium Development Goal /MDGs, especially in the area of reducing the incidence of HIV and the number of HIV-related deaths. Globally, countries are working hard to achieve the ambitious goals of the SDGs, to bring the world to some life-changing “zeros”, including AIDS⁴. In many parts of the world, the number of new HIV cases continues to decline. Access to antiretroviral therapy has increased at an extraordinary rate, avoiding millions of deaths⁵. Standard HIV/AIDS epidemic control measures- control, eradication-represent increasing levels of success in ending the incidence of this epidemic infection.

But, on the other hand, studies have shown that in some countries, there has been an increase of risky sexual behaviors among young people. Unfortunately, knowledge about HIV and HIV prevention remains low in this target group. Furthermore, stigma and discrimination against people living with HIV/AIDS, continue to act as barriers to testing and seeking health care services.

The complexity of HIV / AIDS issues is very wide and goes beyond the medical aspects of the disease. Many of these issues are related to behavioral and social aspects, such as public awareness of disease and risk perception⁶, high-risk behaviors and willingness to be tested⁷, and social stigma⁸. Numerous multi-disciplinary studies have been conducted to uncover these socio-behavioral aspects of the disease.

In Albania, the HIV/AIDS epidemic appeared relatively later compared to other European countries - the first case of HIV was diagnosed in 1993⁹. Albania continues to be a country with a low prevalence of HIV infection. The prevalence of HIV infection in Albania is about 0.046%.

But although, Albania is considered a country with a low prevalence of HIV infection, the growing trend of cases is evident. Based on the seroepidemiological data of the Institute of Public Health, until November 2019, the number of people diagnosed with HIV/AIDS in Albania, is 1298, with a tendency to increase the number of cases in the age group 15-24 years¹⁰.

The main sources of HIV/AIDS epidemiological data in Albania are: National HIV/AIDS Program, Infectious and Pediatric Service at QSUT, University Hospital for Lung Diseases, National Blood Transfusion Center, Voluntary Counseling and

Testing Centers at the prefectures level, various non-governmental organizations (NGOs), and Public Health Directorates in the districts.

Data on persons tested for HIV are collected by completing the HIV file. Positive samples with the ELISA test are confirmed with the Western Blot test at the National HIV/AIDS Reference Laboratory at the Institute of Public Health or at the Laboratory of Microbiology, at QSUT.

PURPOSE

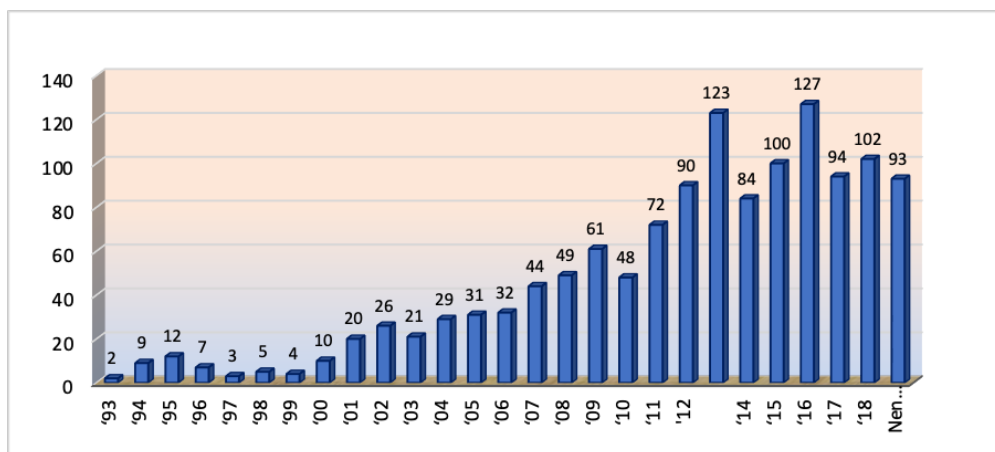
The purpose of this paper, is the analysis and assessment of the epidemiological situation of HIV/AIDS in Albania, for the period 1993 - November 2019.

METHODOLOGY

This paper presents and analyzes the cumulative national data (1993- November 2019) of diagnosed seropositive cases. This data was provided to a group of different populations such as: people suspected of clinics, blood donors, volunteers at risk for HIV/AIDS, people from vulnerable groups to HIV/AIDS (injecting drug users, sex workers, men who have sex with men, victims of trafficking, etc.), transfused persons, pregnant women, as well as, persons seeking testing for the visa application. Positive sample data with the ELISA test, after being confirmed with the Western Blot test, were collected by completing the HIV file.

RESULTS AND DISCUSSION

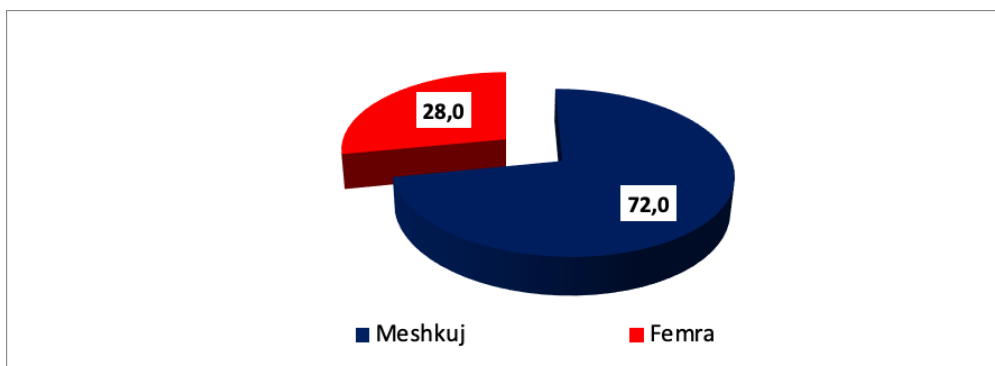
Based on the Institute of Public Health data, in Albania a total of 1298 cases of HIV infection have been registered (from the diagnosis of the first case of HIV positive in 1993 and until November 2019). The data show that despite the increasing trend in the number of cases, Albania continues to remain between countries with low prevalence of HIV infection in the general population - about 0.046% (population according to the 2011 Census). The number of cases diagnosed with HIV infection in 2019 alone (until November 2019) is 93.



GRAPH 1. Distribution of HIV cases by years (until November 2019)

Almost half of the HIV-positive cases (49.5%), reported in 2019, were referred by clinics and recommended tests. Other cases were respectively: 18.3% from voluntary testing at voluntary counseling and testing centers/QKTV, 14% from blood donor testing, 13% from epidemiological follow-up (for the partner or children); 3.3% of the tests for documentation reasons or confirmed from abroad and 2.2% belong to pregnant women tested in 2019 which are recommended by health staff (based on the guide line for prevention of infectious agents from mother to child).

Analysis of the distribution of HIV-positive cases by gender shows that 72% of cases (934 cases) are male and 28% (364 cases) are female. During 2019, 66 men and 27 women were diagnosed with HIV / AIDS. The lower number of women diagnosed with HIV infection is related to the smaller number of tests in women compared to men, although the number of women tested during 2019 has increased due to the testing of pregnant women.

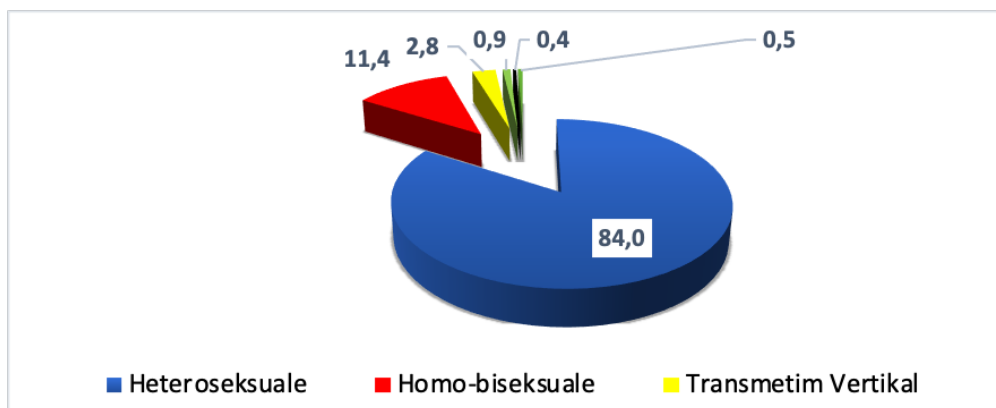


GRAPH 2. Total distribution of HIV cases by gender (%), November 2019

Sexual transmission (via heterosexual and homosexual intercourse) of the HIV virus, continues to be predominant in Albania - about 95% of cases. In recent years there has been an increasing trend in the number of men who have sex with men / MSM, diagnosed with HIV, but according to the Bio-BSS study, as well as the high level of stigma for the MSM community, the number of people who living with HIV belonging to this community, should be even higher¹¹.

Vertical transmission, from infected mother to child is 2.8% of total cases (36 cases; 1 case in 2019). Cases detection of vertical transmission (1997) and the increase of their number after the 2000s, led in 2015 the Ministry of Health to approve the guideline for screening pregnant women for some infectious agents, including testing for HIV¹². According to this guide, pregnant women are offered screening for HIV infection, in order to reduce the risk of mother-to-child transmission of the virus, as well as to protect women's health.

Injecting drug users account for 0.4% of cases, although it has not been established whether they contracted HIV through the exchange of syringes. About 0.5% of the total cases, the transmission route is undefined.



GRAPH 3. Distribution of HIV cases by route of transmission (N = 1298)

The distribution of HIV positive cases by age groups, shows that in Albania predominates positive cases at 35-44 years age group, represent 29.8% of the total cases, followed by 25-34 age group years, with 27.3%, 45-54 age group years, with 17.7%, 55 -64 years old are 10.2%, 16-24 years old, 8.9%, while children 0-15 years old are 3.5% of the cases. A lower percentage represents the age group over 65 years, 2.5%. During 2019, one HIV-positive child was reported, bringing the total number of HIV-infected children to 45.

Analyzing the HIV/AIDS epidemiological data, by geographical areas, it is evident that the HIV epidemic continues to be a still urban phenomenon - 72.6% of HIV-positive people live in urban areas. The largest number of cases (46% of

them) are reported in Tirana, and with a large difference from Tirana are presented districts such as Durres (6.9%), Elbasan (6.2%), Vlora (3.9%), Lushnja (3.2 %) etc.

The number of voluntary HIV tests remains one of the important indicators to assess the epidemiological situation of HIV / AIDS. The main weight of HIV testing is occupied by blood donor tests that are performed as mandatory tests. Despite the interventions and efforts made these two decades to increase the number of voluntary tests, their level still remains quite low. Stigma continues to be one of the main barriers to HIV testing.

CONCLUSIONS AND RECOMMENDATIONS

Although with an increasing trend of cases diagnosed with HIV, Albania continues to remain a country with a low prevalence of HIV infection.

The sexual route of HIV transmission predominates in Albania

The age group most affected by HIV / AIDS is 25-45 years old, although HIV infection is present at all ages

HIV infection continues to be an urban phenomenon in Albania, and most cases of HIV infection are in Tirana.

The number of voluntary HIV tests remains low and a significant percentage of HIV positive cases are diagnosed at advanced stages

Stigma and discrimination against HIV-positive people continue to be one of the main barriers to HIV testing.

It is necessary to continue careful monitoring of HIV / AIDS epidemic in Albania and to strengthen HIV prevention programs, especially in key high-risk populations.

Continue to inform the population about HIV / AIDS and encourage voluntary HIV testing, is one of the ways of lowering the actual figures.

It is necessary to intensify informative, educational work with young people at all levels and by all actors. Promoting routine examinations among young people should be part of these interventions.

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Natural Birth After Cesarean Section ____

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Abstract

Vaginal birth after cesarean section (VBAC) describes a vaginal delivery in a woman who has given birth via cesarean section in a former pregnancy. Patients desiring VBAC delivery undergo a trial of labor (TOL), also called trial of labor after cesarean section (TOLAC). While TOL is an accepted and generally safe practice, serious potential complications include uterine rupture or uterine dehiscence and associated maternal and/or neonatal morbidity. Providers caring for patients with prior cesarean section need to counsel patients regarding potential risks and benefits of TOL and the factors which affect the likelihood of successful vaginal delivery. These providers must be knowledgeable regarding intrapartum management of patients undergoing TOLAC and able to recognize and appropriately manage potential complications. This activity reviews the evaluation and management of patients undergoing vaginal birth after cesarean delivery and highlights the role of interprofessional team members in collaborating to provide well-coordinated care and enhance outcomes for affected patients.

Key words: Vaginal birth after cesarean section, management

Introduction

Vaginal birth after cesarean section (VBAC) is the term applied to women who undergo vaginal delivery following cesarean delivery in a prior pregnancy. Patients desiring VBAC delivery undergo a trial of labor (TOL) or trial of labor after cesarean section (TOLAC). While TOL is an acceptable, generally safe practice, serious, potential complications include uterine rupture or dehiscence with associated maternal and/or neonatal morbidity. Providers caring for patients with prior cesarean section need to be aware of and able to counsel patients regarding risks and benefits of attempting TOL, factors which affect the likelihood of successful vaginal delivery, and knowledgeable regarding intrapartum management of patients undergoing TOLAC (1).

Etiology

As the cesarean delivery rate has increased so has the number of patients becoming pregnant who have experienced cesarean section in a prior pregnancy. Patients may undergo vaginal birth after cesarean section either as a planned procedure or due to precipitant labor.

Epidemiology

Since 1970, the rate of cesarean delivery has increased dramatically from 5% in 1970 to 30% in 2005 (2). The rate of cesarean delivery peaked in 2009 at 32.9% and was 31.9% in 2016 (3). In the early 1970s, when the cesarean delivery rate first began to rise, it was generally felt by medical providers that if a patient had had a cesarean section, she should deliver all future babies by this route. Healthcare professionals began to question the dictum, «once a cesarean, always a cesarean,» and subsequently, the number of patients undergoing VBAC delivery began to increase. From the mid-1980s to the mid-1990s, TOLAC was encouraged, and an increase in VBAC delivery was seen along with a concomitant decrease in cesarean delivery rate. Between 1985 and 1995, the VBAC rate increased by over 20% with an associated decrease in cesarean section rates. As VBAC became more common over this time, so did the number of reported significant complications. Such complications and accompanying malpractice suits led to a decrease in VBAC.

Complications in patients undergoing TOLAC can occur; however, appropriately selected patients can benefit from attempting a vaginal delivery

in the appropriate setting. When successful, VBAC is associated with a decrease in maternal morbidity and decreased risk of complications in future pregnancies. Patients who have undergone successful VBAC benefit from the avoidance of surgical recovery in the postpartum period. Increase in VBAC deliveries also will serve to decrease the overall cesarean delivery rate. More recently it is recognized that as the number of cesarean sections a patient undergoes increases so does the risk of significant obstetrical complications. These complications include massive postpartum hemorrhage, placenta previa, and related placental disorders (4). By avoiding multiple cesarean deliveries, patients planning large families may particularly stand to benefit from undergoing vaginal birth after cesarean section.

History and Physical examination

All pregnant patients should have a comprehensive history and physical exam at the initial prenatal visit as well as on admission to labor and delivery. History should include a detailed obstetric history consisting of the year of any prior pregnancies, and pregnancy outcome (abortion, ectopic, or delivery). Weight and gestational age of the infant at delivery should be recorded. If patients have had complications with prior pregnancies, this should be noted and pertinent details described. In some cases, it will be beneficial to obtain records from prior prenatal care providers or from the hospital at which the patient delivered her other babies (5).

Concerning mode of delivery, it is important to note if prior babies were delivered vaginally or by cesarean section. For patients experiencing prior operative delivery (either operative vaginal delivery or cesarean section) details about the indications for operative delivery should be noted. Ideally, the operative notes of any prior delivery should be obtained and a copy available in the patient's chart.

General physical exam in a patient with a prior cesarean section is performed. The pelvic exam may include an assessment of clinical pelvimetry which is a series of assessments designed to predict the likelihood of vaginal delivery. While clinical pelvimetry is frequently performed, this assessment has not been found to be highly predicted of successful VBAC or vaginal delivery and should not be used as a sole predictor to determine if a patient can undergo a trial of labor (6).

For patients planning a trial of labor after cesarean section, a pelvic exam close to term may provide additional guidance regarding delivery planning. Ripening of the cervix (softening and effacement) and low station of the fetal head provide some encouragement that patient may be more likely to enter labor

spontaneously. A near-term attempt should be made to estimate the fetal weight either by physical exam or using ultrasonographic assessment. This information should be considered but should not be used singularly to determine if a trial of labor should be attempted, as no methods for determination of fetal birth weight are highly accurate (7).

Evaluation

Some women will not be candidates for TOLAC. Patients having had prior classical cesarean section or prior incision into the contractile portion of the uterus have higher rates of uterine rupture, and thus, a planned, repeat cesarean section is the recommended mode of delivery. Ideally, operative reports from prior surgeries should be obtained and reviewed for a description of the previous uterine incision. When this is not possible, for example when prior surgery was performed in another country, the patient is considered to have an “unknown scar.” Because the vast majority of cesarean sections are performed with a low, transverse, uterine incision, it is reasonable to query the patient about the circumstances surrounding her delivery. If the history does not suggest a scenario in which vertical incision would have been likely, for example, cesarean section performed at 24 weeks when the lower uterine segment is less likely to be developed, it is reasonable to allow TOL. The rate of uterine rupture in this situation has been found to be similar to the rate for patients with prior low transverse cesarean section (8).

Likewise, the rate of uterine rupture is felt to increase with increasing number of prior cesarean sections. With 1 prior LTCS, the rate of uterine rupture is less than 1%; whereas, the rate is slightly higher with 2 prior cesarean sections at 1% to 2% (9).

Patients with other conditions involving incision into the upper or contractile portion of the uterus are generally felt not to be candidates for TOLAC as the rate of uterine rupture is unacceptably high in these situations. In addition to prior classical uterine incision such conditions would include prior “T” or “J” type incision at cesarean delivery or prior transmyometrial incisions to resect uterine fibroids or to facilitate open fetal surgery. Patients with a prior history of uterine rupture also have a high rate of uterine rupture and planned repeat cesarean delivery is recommended prior to the onset of labor at approximately 36 to 38 6/7 weeks estimated gestational age (10).

Facilities offering TOLAC should have the capability to perform an emergency cesarean delivery. While the availability of such resources seems prudent concern has been raised that this requirement limits some patients, such as those living in rural areas, from having the option of vaginal delivery after cesarean section. It

was also noted that with careful counseling some patients might choose TOLAC even in situations where resources are limited (11).

In considering TOLAC versus PRCD patients may also benefit from counseling regarding likelihood of vaginal delivery. The rate of successful vaginal delivery after a prior cesarean section is found to be 60% to 80% (12). In general, patients with non-recurring indications for cesarean section, for example, breech presentation, are thought to have higher likelihood of vaginal delivery. Patients with prior vaginal delivery also are found to have higher success rates of vaginal delivery (13). Patients entering labor spontaneously have higher success rates as well, when compared to women undergoing induction of labor.

Treatment - Management

Patients should have fetal heart tones monitored closely in labor and attention should be made to appropriate labor progress. Continuous fetal heart rate monitoring is strongly recommended. If concerns arise about possible uterine dehiscence or rupture cesarean delivery should be performed promptly. The most common sign of uterine rupture is an abnormality of the fetal heart rate tracing, which is seen in approximately 70% of cases of uterine rupture (14). Other findings which may be seen if uterine rupture occurs include increase or decrease in uterine contractions, severe abdominal pain/pain out of proportion for labor, sudden loss of fetal station or finding of blood in the urine or urine collection bag. Even with close and meticulous monitoring uterine rupture can occur suddenly and without warning resulting in fetal compromise, fetal damage or death.

Vaginal delivery, delivery of the placenta and postpartum support is typical for patients undergoing VBAC delivery. Rarely, manual exploration of the uterus following placental delivery may lead to suspicion or discovery of previously undetected dehiscence of the uterine scar. Repair of such a defect is not required unless there is ongoing bleeding. Likewise, patients may experience occult uterine rupture which can lead to bleeding following delivery. VBAC patients experiencing post-delivery hypotension or other signs of hypovolemia should be evaluated promptly with consideration given to the possible diagnosis of uterine rupture.

Complications

The most significant complication which can occur in patients undergoing TOLAC is uterine rupture which involves the incision made into the uterus at the time of the prior cesarean delivery. Uterine rupture is a medical emergency

and patients must be taken immediately for laparotomy for delivery of the fetus and to address and additional complications. When uterine rupture occurs, transfer of blood and oxygen to the baby is interrupted, and this can result in fetal complications including fetal acidosis, a need for neonatal intensive care unit (NICU) admission, and even death. While the absolute risk of perinatal mortality is low with TOLAC, the risk is slightly higher when compared to babies born to mothers undergoing planned repeat cesarean delivery (0.13 versus 0.05%)(15) Some patients attempting TOLAC may require a cesarean delivery. When this occurs after labor, the risks of postpartum infection, uterine atony, and wound separation are higher in comparison to patients who have planned repeat cesarean section (16).

Enhancing Healthcare Team Outcomes

The management of patients undergoing vaginal delivery after a prior cesarean section is best done with an interprofessional team that includes labor and delivery nurses. An obstetrician should always be present and an operating room with anesthesia stand by must be ready in case a cesarean section is needed. While successful vaginal deliveries have occurred following prior cesarean sections, there are ample reports of uterine rupture- hence clinical acumen in decision making is necessary to avoid litigation.

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*Early detection of Diabetes Mellitus in transition countries – Kosovo*_____

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ABSTRAKT

Type 2 diabetes has an insidious onset with a long latent period of dysglycemia. The incidence of diabetes mellitus today is epidemic. 90-95% of patients are patients with type 2 diabetes. The disease develops slowly, and has a long asymptomatic phase. Clinics are opened for 5-10 years. A patient with diabetes, due to complications of the disease, dies prematurely from his peers without diabetes. Evidence suggests that early detection of diabetes with appropriate screening methods, especially for people at high risk for diabetes, will help prevent or delay vascular complications and thereby reduce the clinical, social, and economic burden of the disease. Ideal screening models have not yet been found for early detection of the disease, for the detection of the stage of increased fasting glucose and the phase of impaired glucose tolerance. The final answers to the question have not yet been obtained: who will perform the screening, where will it be performed and how? How to identify risk groups? How to conduct screening in transitional family medicine? There is also evidence to suggest that intervention in the prediabetic phase is superior to the diagnosis of diabetes.

The family doctors played a key role in the early detection of the disease.

Key words: diabetes mellitus, prediabetic, family doctors, screening, diagnosis, etc.

Epidemiology and significance of chronic diabetes mellitus

Diabetes is a chronic condition that occurs when the islets of Langerhans in the pancreas do not produce enough insulin or when the body cannot use the insulin it produces efficiently.

Diabetes mellitus is a very severe, chronic, lifelong disease. Today it is the fourth or fifth leading cause of death in developed countries. It is estimated that 194 million people around the world suffer from diabetes. The incidence of diabetes is an epidemic.¹ People with diabetes die significantly earlier from cardiovascular disease than those without diabetes. A patient with diabetes dies 5 to 10 years earlier than his peers without diabetes.² The disease develops slowly, has a long asymptomatic phase. 90-95% of patients are patients with type 2 diabetes. At the time of clinical detection, the disease had already lasted 5-10 years, and complications were already developed.^{2,3} Therefore, it is necessary to detect the disease in an asymptomatic phase. Scientific and professional considerations today play a major role in the early detection of diseases.

Early detection of the disease

The role of the primary care physician (pediatrician, GP, gynecologist) is crucial today in the early detection of the disease. Early detection of the disease belongs to one of the four levels of care of the mother in the care of the disease: prevention and early detection, treatment of the disease, the process of protection and analysis of the results of protection.^{4,5} Diabetes screening guidelines and Diagnosis of diabetes according to the American Diabetes Association (ADA) In 1997 it was as follows: gradual determination of glucose for all over 40 years and those under 40 years, if in risk groups, etc. universal screening.⁶ However, this method of screening was not only expensive, but also required complicated logistics for a long-term continuous process. Therefore, in several studies, another strategic approach has been proposed that focuses on high-risk mead screening or real-time screening - opportunistic, targeted screening.⁷

Consecutive targeted screening studies have been more focused on «economic» analyzes in favor of targeted screening. According to Hugger's study, general screening of the entire population is more expensive and there would be less detection of diabetes according to the screening for age-dependent hypertension in the study.⁷ However, this study also brings something new. Using Mark's model to predict tax performance from screening studios⁸ and UKPDS, ⁹ makes assumptions about the benefits of early detection of asymptomatic diabetes.

The benefits of early detection according to the study are: - screening for type 2 diabetes can reduce the duration of asymptomatic diabetes from 10 to 5 years - the risk of intervention in cardiovascular diseases in diabetics is reduced by 19% - 25% in the 44-year-old group, 47% in the 45-64 age group and 65% in the 65-year-old group. 7 Spijkerman's study, conducted in a population of 50 to 75 years of age, tested a screening model. According to the questionnaire, the people above the grade 6 were invited to confirm glucose for fasting. This way of sending the pollinator is not suitable for permanent screening, here for one-time screening, and at a certain time. In addition, according to the pollinator, such patients already have known cardiovascular risk factors and have less benefit from screening, and those who are not aware of their disease, according to the risks of pollinator, are not involved in the screening process.¹⁰

Many studies around the world have not given answers: at what time to be screened, how often, in which places and to whom to do the screening? How to identify high-risk puddles? The Vincent Declaration Diabetes for Primary Care (PCDG) provides screening guidelines for family medicine: 11

1. Determine glucose for all persons with symptoms: fatigue, weight loss, polyuria, genital itching - clinical determination of the disease.
2. At intervals of 3 years, during a visit to the office, confirm the glucose of all persons over 45 years of age:
 - if the parents of the siblings have type 2 diabetes
 - if they have hypertension and other cardiovascular diseases
 - if they have impaired lipid metabolism and / or BMI > 27
 - if there was diabetes in the pregnancy and women, if they gave birth to children > 4000 grams
 - certain ethnic groups.

Thus, PCDG recommendations do not apply to mass time campaigns, but a continuous early detection process is recommended here according to the guidelines for creating risk groups. The contract suggests an interval of 3 years, because it is assumed that since the previous determination of blood glucose (GUK), complications have not developed, as long as diabetes has developed within 3 years.

Profession and science agree on one thing - this type of screening procedure - regular contact with the health service. Each patient has a selected GP. In most countries, 80-90% of patients visit their GP at least once every 3 years. In addition to regular contact with the patient, the GP has a record of known chronic diseases and risk factors.¹² Additional additional dynamics and challenges in screening are provided by studies that indicate new categories of diseases: «increased fasting glucose» and «increased fasting glucose» glucose "WHO 1999. year, 13.¹⁴ ADA

2003. 15. People with a combined risk of obesity and smoking have an increased risk of developing cardiovascular disease. Therefore, these conditions should be diagnosed early.^{11,15}

Diagnostic disorders

In most European countries, the reference values of the lower limit of GUK for increased glucose per cent are 6.1 mmol / l according to the WHO (ADA offers a lower limit of 5.6 mmol / l). The recommended WHO classifications according to the GUK 2 x approval are:

1. Percent GUK 6.0 mmol / L = normal back
2. Percentage GUK 6.1 - 6.9 mmol / L = increased glucose per percentage → do OGTT: - Regular detection (control 3 years) - 7.8 - 11.1 mmol / L (venous plasma) = glucose tolerance
3. Post GUK 7.0 mmol / L = diabetic mellitus

The categories «increased fasting glucose» and «impaired glucose tolerance» require intensive supervision by a family doctor. The diabetes mellitus category is an effective treatment. It should be potentiated that for the diagnosis of diabetes it is necessary to start with at least 2 mornings that were not done on the same day.

If both are unambiguous, we have a diagnosis and if they argue, an OGTT is done. If the test shows impaired glucose tolerance, monitoring is required - repeat OGTT for one year. Intervention should be provided - advice on diet and exercise, which has proven to be an effective method of preventing the development of manifested diabetes.^{5,6} Thus, the necessary role of primary care physicians, especially mothers in the early detection of asymptomatic asymptomatic of increased starvation glucose and impaired glucose tolerance.

Early detection of diabetes mellitus in transition countries

An additional problem is the early detection of the disease in the lands of the transitional health care system such as the Republic of Kosovo.

At the end of 2019, the National Institute of Public Health (NIPH) stated that: “In Kosovo, it is estimated that somewhere around 5-7 percent of the population has a prevalence of the disease, where 20-30 percent of the levels are insulin dependent and it is provided by the Ministry of Health free of charge. The MS-dependent

insulin patient registry has approximately 13,000 patients. There are 40 beds within the UCC where 800 patients are hospitalized every year. «

Second, screening for at-risk groups is problematic, as there is no quality record in family medicine. and as long as it exists, it is not used happily. Doctors and patients occasionally leave the health care system in the treatment of diseases (private unrelated clinics) for which there is no record. Primary protection has not yet come to life

gatekeeper to enter the health system and to be placed as a health guard. Reforms in the field of primary health care are brought administratively without participation in primary health care.^{17,18}. I think that the optimal procedure for conducting screening depends on the health system in which it is conducted, and the Republic of Kosovo so far does not have enough institutional screening tests, especially of the young population.

The transition from asymptomatic to symptomatic diabetes is individual, from rapid to delayed, lifelong. The transition from the phase of increased fasting glucose and impaired glucose tolerance to diabetes is also individual. The progression of the development of complications is also individual and depends on the health and socio-cultural standard of the population. Thus, the process of screening for early detection of diabetes is imperative for a new approach of the parent doctor in the management of chronic diseases. At the national level of a particular health system, a contract for continuous screening must be reached. Professional associations in Kosovo need to develop an early detection program according to ADA, WHO, PCDG, studies conducted and the expected frequency of lands in transition.

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*Contribution of Medical Anthropology in the Treatment of Health Care*_____

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Abstract

This study deals with the achievements of *medical anthropology*, as one of the subdivisions of *Anthropology*, little or not known until now in Albania. It relies, first of all, on the health culture of the peoples and their social construct in relation to health, which is dictated - among others- by cultural norms and local decision-making institutions. The article further discusses the connections of *Anthropology* with *medical practice*, the areas of application of medical anthropology and the current agenda of its action.

The second part is dedicated to the *Anthropology of COVID-19*. According to the author, this new pandemic has hit human populations, perhaps like never before, at least in terms of the extent shown by previous models and forecasts, changing their environmental balance. It brings the personal experiences of 15 medical anthropologists, who have researched specific aspects of the *pandemic* in different areas of the globe. Their involvement in the analysis of the facts so far and in terms of the socio-cultural response of different population groups to it deserve special attention, as well as the interaction of emergencies involving universal health care, climate change and civil liberties.

Key words: *Medical Anthropology; Anthropology of COVID-19.*

What is Medical Anthropology?

Medical Anthropology is one of the implementing subdivisions of *Anthropology* that aims to use the biological, social and cultural data of Man, to better understand the factors that affect the health and well-being of human society, according to the experience and distribution of disease in geographical areas and IN different ethnocultural human groups (A. McElroy & PK Townsend, 1989; A. McElroy, 1996).

It utilizes local empirical experiences in the prevention and treatment of diseases in the context of social connections for their management, and seeks to demonstrate the cultural values of different medical systems in the treatment and prevention of diseases, especially those with endemic spread (GL Albrecht et al., 2000; H. Baer et al., 2003).

Like any other discipline, *Medical Anthropology* relies on different theoretical approaches, but - above all - on the health culture of peoples, as a bio-scientific epidemiology, as well as on the social construct of different peoples in relation to the health of individuals/ communities living in a given ecological environment, which is dictated - to some extent - by local cultural norms and social institutions (JM Comelles & A. Martínez-Hernández, 1993).

Links between Anthropology and Medical practice

The links between *Anthropology* and medical practice have already been documented (E. Dongen & JM Comelles, 2001). In fact, classical anthropology has been positioned on the basis of preclinical medical sciences. But, over time, medical education began to narrow down to the limits of hospital practice (M. Foucault, 1963; I. Bültzingslöwen, 1997). However, the hegemony of hospital clinical education and experimental methodology, suggested by Claude Bernard, highlighted the need to return to medical geography and topography, based on ethnographic, demographic, statistical, and epidemiological data.

With the further development of training in the clinical sphere, the basic source of knowledge in medicine led to the “abandonment” of ethnographic studies as a basis for study, with the exception of isolated cases in the field of primary health care, folk medicine and public health. However, the “abandonment” of *ethnography*/ respectively of *social anthropology* by *medicine* was never known, until the beginning of the XX century, as a final “crack” (J.M. Cornelles, 2000: 41-75).

This tendency between the two disciplines remained unchanged during the twentieth century. Let us not forget that an increasing number of contributors

to *medical anthropology* even though they have had primary training in medicine, nursing, psychology, psychiatry and social sciences, some of them share with others important roles in anthropological studies. It is time to mention here some of the theoretical debates, which highlight the broad international panorama of interest in *medical anthropology*, at least for some of the current problems of global morbidity that they do not find the final solution only through the achievements of clinical and laboratory practice to date, as in the case of mental and sexual health, pregnancy and childbirth, aging, drug addiction, functional disabilities, uncontrolled nutrition, infectious diseases associated with epidemics global etc., which may find the medical team almost unprepared in terms of their correct management (G. Genest & F. Saillant, 2005).

Current areas of application of Medical Anthropology

In the US, Canada, Mexico and Brazil, institutional cooperation between *anthropology* and *medicine* has long been legalized regarding the implementation of specific health programs “for ethnic and cultural minorities”, but also for the ethnographic qualitative assessment of hospital health institutions and primary hospital service. The main purpose of these programs was then to resolve conflicts that arose between doctors, nurses, support and administrative staff.

In this context, the ethnographic part of cultural reports proves that the “crisis”, that has arisen in the application of therapeutic protocols on the health of the sick, has had (perhaps unintentionally) a selective character. This situation has led researchers to develop new therapeutic criteria, which must take into account the reality of different “therapeutic communities”.

This new methodological criterion would indeed lead to a kind of “guardianship”, but - ultimately - it contributed to new institutional policies that promote public health in the community and, especially, in the school curriculum.

The empirical response of anthropologists regarding their involvement in the above mentioned areas can be concretized in the development of community health programs in countries with distinct cultural and social “cuts”, such as Albania, where the “reaction” to some new forms in therapeutic and health practice. For this, our doctors of local health centers and especially those of the regional and central hospital service should appreciate, more than before, the help of traditional empirical “healers”, who have relied in folk medicine.

In developed countries, since the 60s of the XX century, the concept of *bio-medicine* was developed, because medicine began to face more and more a series of problems that require solutions through the inclusion of social and cultural factors

predisposed to a particular community, which is still largely lacking in clinical or laboratory protocols. Among these factors can be mentioned:

- a) attachment to the universally accepted system for acute infectious pathologies of an adjunct system designed for chronic degenerative pathology without any specific etiological therapy;
- b) the need to develop long-term treatment mechanisms and strategies, up to therapeutic treatments with surgical intervention;
- c) inclusion in the treatment of the concept of quality of life, in addition to the classical therapeutic criteria.

To these criteria are added the problems related to the implementation of community health mechanisms. These problems are initially perceived as tools to combat unequal access to health services. However, once a comprehensive service is available to the public, new problems arise from ethnic, cultural, religious differences, or differences between age, gender, or social classes. In all these cases, local and qualitative ethnographic research is necessary to understand how and to what extent patients, through their social networks, demonstrate knowledge of health and disease, when their experience is outlined (most likely) from complex cultural influences. These influences result from the nature of social relations in advanced or developing societies and from the influence of social communication media, especially audiovisual media.

Current Agenda of Medical Anthropology

Today's research in the field of *Medical Anthropology* can be summarized in six basic directions:

- a) multiple development of medical knowledge and health care systems;
- b) further strengthening of social ties between the patient and the treating physician;
- c) inclusion/ integration in medical protocols of cultural peculiarities in different social environments;
- d) taking into account in the medical treatment the interaction of social, environmental and biological factors that affect the health and morbidity of both the individual and the relevant community as a whole;
- e) undertaking critical analysis on the interaction of specialized services in the case of migrant groups;
- f) the impact of *bio-medicine* and *bio-medical technologies* on the clinical experience of countries like Albania.

Anthropology of COVID-19

Scholars from many disciplines, including *Anthropology*, have meanwhile entered a new era of human influence on the planet. The recently created term *Anthropocene* implies that our species have been responsible for increasing carbon emissions, global warming to a dizzying rate, breaking previous living habits, and directly eliminating a staggering number of the planet's fauna - for to mention only the most negative results of planetary change, due to the unconscious actions of man. And yet, since March/ April 2020, the situation we are in seems to suit imaginary "foreign" observations of our planet.

The *COVID-19* pandemic has engulfed the global human population with a sudden "punch" like never before, at least in relation to previous historical (pan) epidemics, which have caused significant reductions of up to 90% of the human population (A. Dhima, 2017). This new pandemic has struck humanity, perhaps like never before, at least in terms of the scale and extent shown by the patterns and predictions so far. Although this disease has not made people powerless, it certainly seems to have changed their environmental balance.

No one can predict the future in the face of today's uncertainty. But anthropologists are already convinced of possible future directions:

- Will the need for stronger government infrastructure fade?
- Will the scientific evidence and knowledge of experts be evaluated more seriously in countries such as Albania, where their authority has been neglected to date?
- Will national xenophobia lose its calling in the face of a virus that does not respect borders and demands a global response?
- Will this situation force countries to address the root causes of health inequalities/ gaps in populations experiencing the worst effects of the epidemic due to ethnicity, gender, racism or age?
- Or will the voices expressing a modern version of *social Darwinism* win the "battle"?

Amid these uncertainties it is clear that anthropologists can make a valuable contribution to illuminating a myriad of *COVID-19* intertwined biological and social complexes.

In articulating the stages of the ritual extracted from his earlier treatise, Arnold van Gennep designed the history of behavior and attempts to quarantine the "foreigner": *"Each larger society contains within it several distinctly separate groupings.... In addition, all these groups break down into still smaller societies in subgroups... The length and detail of each stage through which foreigners*

and locals move toward each other... others differ in different people", he noted. However, *"the basic procedure is always the same for a company or an individual; they must stop, wait, go through a transitional period, enter, get involved"* (A. van Gennep, 1910: 707-709).

More than a century later, anthropological observations about the "breaking" of biological boundaries, the intersection and approximation of all human groups, today's anthropologists are of the opinion that the time has come for a new understanding of people in relation to their social worlds, ecological and with each other. Each essay, recently written by prominent anthropologists around the world, reflects the common goal of providing real-time reflections on, so to speak, the evolving/ rapidly changing opinions from this pandemic.

Eben Kirksey has witnessed relationships between humans and other living species from his early field trips to West Papua. Providing the cultural and biological background of the natives, the author insists on a new focus on the show rather than the origin, thus avoiding a trunk search for solutions in favor of a *rhizomatic* exploration of multiple pathways (E. Kirksey, 2019). Alongside him, Donna Haraway and Anna Sing have helped shape the new meaning of a contemporary ontology and its further development in the field, as a key research tool (Donna J. Haraway & Anna Sing, 2019).

Ali Sadruddin and Marcia Inhorn encourage researchers to think about the impact of *COVID-19* on aging issues (A. Sadruddin & MC Inhorn, 2020: 17-23). Dealing with personal experience in the United States, Kenya, and Rwanda, they provide compelling comparative evidence. Although some in the United States seem willing to dehumanize aging and call for it to be "sacrificed," medical anthropologists oppose such thinking and instead claim that caring for the elderly is an important part of to be human. A model for caring for the elderly comes from Rwanda, where they are being treated during the *COVID-19 pandemic* with special care through "little things": daily intimate support, the presence of neighbors sharing food with them or who take on the necessary supplies for people on the outskirts of their community.

Agustín Fuentes offers a bio-social perspective on both forms of *pandemic*, in terms of the meaning of "social/ physical distance". He notes, for example, that *"not being sociable with people does not create opportunities to overcome the consequences of illness"* and that, when people are isolated, *"bad things happen"*. These *bad things*, according to the local mentality, include *"physical and psychological damage"* (A. Fuentes, 2002). In explaining the nature of the current pandemic, this bio-social perspective also emphasizes prehuman/ inhuman relationships, the role of primitive *Homo sapiens* in reshaping Earth's ecosystems, and the need to understand *virus biology* as well as the *social context* of the *pandemic*.

Reporting from the Canadian capital, Jen Pylypa studies how the *pandemic* was beginning to affect food purchases (J. Pylypa, 2020: 33-38). She invited members

of her focus-group to the *Health and Globalization Course*, just at the time the virus shut down her university. This essay constitutes an in-depth judgment by comparing *COVID-19* with other recent disease epidemics. According to her, this *pandemic* is important, because it is directly affecting the West to a greater degree, compared to previous *local epidemics*. On this occasion, she suggests to the Canadian public to gain more knowledge about the geographical specifics, while rightly emphasizing “panic shopping”.

Focusing on a contradictory cultural gesture, Bjarke Oxlund emphasizes the idea that “*biology and culture cannot be separated when considering COVID-19*” (B. Oxlund, 2020: 39-44). Like many other researchers, he studied the geographical distribution of *HIV/ AIDS* in Uganda and South Africa, where he found that there was an immune deficiency in children. In this essay he is against the social mandate of physical distancing, as a frontal defense against *COVID-19*, noting that while the embodied practice of shaking hands can transport disease, it can also convey inappropriate meanings to the survival of interpersonal relationships.

Trâm Luong writes about life at the time of *COVID-19* in Ho Chi Minh City (Vietnam), where normally intense air pollution seemed to be declining after the *pandemic* and social media was playing a particularly important role in shaping the idea of limiting social relationships. On the one hand, the “flood” of messages in Vietnam’s largest city was creating hysteria about the spread of the disease, while the government, on the other hand, was also using mobile communication in an attempt to calm people’s fears and controlling behaviors such as “panic purchases”. This policy brought, according to her, the renewal of trust in the Vietnamese state (T. Luong, 2020: 45-49).

Erik Henry brings his experience to the Chinese communities living in Canada to focus on the question of whether *the pandemic* is reshaping this community with typical Chinese cultural “cuts.” Pointing to China’s long-standing efforts to actively cultivate “a collective identity imagined for its citizens”, he suggests that the *pandemic* represents an important episode in defining what it means to be Chinese. For Chinese communities in Canada, these developments have highlighted pre-existing cultural fragments, which are likely to have been exaggerated by the pandemic (ES Henry, 2020: 50-54).

Stephanie Love and Liang Wu use *nautical metaphors* to explain how changes in mobility have outlined the paradoxes of *Globalization*. Their research on sailors, although clearly influenced by the virus, shows that their work has always involved considerable isolation; however, this “*feeling of isolation/ imprisonment has only intensified since the outbreak of COVID-19*”. Love, meanwhile, writes about her experience of “*abandoning the ship*” as she boarded one of the last flights outside Algeria, her research site, while her Algerian friends found no choice but to “*shelter*

her in the country”. Both scientists give examples of how this time of “inhibition” is affecting people and reflects a “*strong inequality of intensity and experience of the disease*” (S. Love & L. Wu, 2020: 55-65).

Caroline Rouse, a prominent medical anthropologist, has focused her essay on the political and structural issues that planted “*the seed in a fertile ground for the spread of COVID-19 rather than the biological features of the virus itself*” (CM Rouse, 2020). Dealing with field research and her experience of scientific knowledge related to the *pandemics* of humanity’s past, she explains how ideology and selective policymaking have shifted the situation from a game of manipulation to a life-or-death struggle. long in the context of structural inequality.

Rijul Kochhar invites scientists to consider the “essential” steps recommended to avoid *COVID-19 infection*. Not all peoples and social strata within themselves are able to take “substantial measures” and - to date - little has been articulated to suggest achievable strategies in this regard; current opportunities (especially financial ones) to stay home are unappropriated, because they apparently do not have all the material resources for such an action. By taking the individual as the basis of choice, the joint response to the *pandemic* thus loses the chance to predict social responses rather than individual ones. Adequate responses to *COVID-19* require attention for all populations globally, as well as the coexistence of emergencies involving universal health care, climate change, and civil liberties (R. Kochhar, 2020).

Leigh Bloch raises the question of whether the *pandemic* could allow people to imagine a different economic order in the future. *COVID-19* is increasingly proving the need for everyone to have adequate housing, adequate health care and income as basic resources to cope with this situation (L. Bloch, 2020). Inspired by the utopian vision of Ursula Le Guinn (1974), the author encourages teachers to think about a radically different future in academic fields, in today’s conditions when education is free and accessible to all, at every level, which would enable anyone to engage in creative thinking.

David Troolin brings an important perspective as an anthropologist, teacher and longtime resident of Papua and New Guinea. News from this region about *COVID-19* is sparse and information on how Papua and New Guinea residents are interpreting and responding to the *pandemic* has been inaccessible to our readers. This essay provides contextualized knowledge about the “*ways of knowing the disease*” by locals, beliefs and practices formed in a complex social environment and, what is important, after era of colonialism. As elsewhere in remote Pacific areas, epidemiological advice about social distancing is seen as deeply at odds with community values, leading to disagreements between government directives and local understanding about vulnerability and protection against pandemic damage (DE Troolin, 2020: 84-90).

The experiences of the medical anthropologists cited above have not felt more valuable and important than their involvement in the analysis of the facts to date on the spread of the *COVID-19 pandemic* and the socio-cultural response of different population groups.

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Morphological, quantitative image analysis and molecular biology of oesophageal squamous cell carcinoma (ESCC), with special reference to tumour progression and human papillomavirus (HPV) involvement _____

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Abstract

Background: It is an urgent need to improve early diagnosis of ESCC, because it is one of the most aggressive cancer. The quantitative image analysis, can aid in the identification of ESCC. Despite much research effort, the major prognostic factor of ESCC remains the pathological stage of the disease as defined by the TNM classification, whereas tumour grading is of limited value in this respect, mainly due to its low reproducibility. A better means for disease prognostication based on improved understanding of the pathogenetic mechanisms is urgently required.

Materials and methods: The material of the present study was derived from a series of 1876 oesophageal surgical specimens taken from a total of 700 patients, who underwent oesophageal resection for an invasive ESCC in Anyang Tumour Hospital, Henan Province of China. Among the cases of ESCC, previously subjected to extensive testing for Human Papillomavirus (HPV) involvement and expression of p53 gene. All cases are analysed by histopathology and by in situ hybridisation (ISH) and PCR, and a group of 272 patients was randomly selected for analysis of the primary tumour, adjacent mucosa and regional lymph nodes, in the quantitative image analysis. All cases and HPV data were subjected to extensive univariate and multivariate analysis to disclose independent predictors of progressive disease.

Results: For the analyses, the ESCCs were graded into two categories: well - moderately and poorly-differentiated. HPV DNA was detected in 116 (18.9 %) of the carcinomas by ISH and in 15.2 % by PCR. In univariate analysis, lymph node status was significantly ($p < 0.01$) predicted by the following nuclear parameters: nuclear area, G0/G1 ratio, HPV DNA status, integrated optical density (IOD), mean optical density (MOD) and S-Phase. In multivariate analysis, 6 variables remained as independent predictors of disease progression ($p < 0.05$ level), the three most significant ones being nuclear perimeter, nuclear roundness and equivalent diameter ($p < 0.01$).

Conclusions: A series of quantitatively measured nuclear parameters seem to be a close correlation with ESCC differentiation and progression in univariate analysis and some of these variables proved to be significant independent predictors of disease progression in multivariate modelling as well. These data clearly advocate the use of quantitative image analysis in searching for additional prognostic factors of ESCC.

Key Words: *Oesophageal squamous cell carcinoma, prognosis, quantitative image analysis, diploidy, Human Papilloma Virus, hybridisation in situ, PCR.*

Introduction

It is an urgent global need to improve early diagnosis of ESCC, because one of most aggressive cancer. In the 2018, by International Agency for Research on Cancer (IARC), the oesophageal cancer is diagnosed in 572 034 new cases, and 508 585 deaths in one year. Its worldwide incidence is to be increased. ^(1, 2) About 60 % of cases are ESCC, and 30 % adenocarcinoma. ^(1, 2, 3, 4)

ESCC represents a leading cause of cancer mortality in certain geographical regions, as Northern China, South Africa, Costa Rica, Afganistan and Iran, but is a relatively uncommon neoplasia in Western countries. The five-year survival rate of ESCC in the USA is 19 %, primarily because is often at an advanced, incurable stage, while and in Golestan province of Iran it is 3, 4 %. ^(4, 5, 6, 7)

The geographical distribution of ESCC, clearly implicate a dominant role for environmental factors in the etiology of this disease. ^(4, 5, 6) A wide variety of such factors have been studied as potential etiological agents, including cigarette smoking (with 35 cancerogen substances), alcohol, exposure to nitrosamines and mycotoxins in the aliments, opium use, nutritional deficiencies and hot beverages. ^(3, 4, 5)

The carcinogenesis of ESCC is a multifactorial and multistep process. It involves various genetic and environmental factors. A number of risk factors have been studied as potential etiological agents, including cigarette smoking (contains

35 cancerogen substances), alcohol, exposure to nistrosamines and mycotoxins in the aliments, opium use, nutritional deficiencies and hot beverages. ^(3, 4, 5)

Apart from the large-scale epidemiological surveys, molecular pathogenesis hes been studied as well, with several ocogenes, tumour suppressor genes, and infectious agents, particulary the role of HPV infections, is implicates in the pathogenesis of ESCC in the high incidence areas.

Despite improved detection methods and therapy, the prognosis of this neoplasia remains ominous, and there is an imminent need for a better understanding of the biology, the behavior of ESCC, and its prognostication. For this purpose, a wide variety of factors have been analysed to predict the clinical course of ESCC, including cell ploidy, cell proliferation markers, cellcycle markers, oncogenes, tumour suppressor genes, growth factors, invasion patterns, tumour-matrix interaction, growth factors, adhesion molecules, immunological factors, histopathologically parameters, mytotic index, lymph node involvement, tumour stge, biological factors, prognostic significance of quantitatively measured cell variables in ESCC and the expression of different cytokeratin molecules as potential marker of tumour differentiation. ^(5, 7, 8, 9, 10, 11) However, the major prognostic factor of ESCC remains the pathological stage of disease as defined by the TNM classification, with the WHO grading and pT classification. ⁽⁴⁾

The key to undertsanding the clinical behaviour and the prognosis of ESCC is the uncoverting of the pathogenetic mechanisms resposabile for the developement of this disease through its precursor lesions: epithelial metaplasia and dysplasia. ⁽¹⁰⁾ As result of this study, is confirmed the frequent involvement of HPV, also the potential role of CK18 expression in progressive disease, and mutations in the p53 gene, which is co-existent with HPV infections. ^(4, 5, 6, 7, 8, 9, 10, 11)

The present sudy was conduced to analyse a wide variety of quantitaively measured nuclear variables of the cancer cells and their relationship to disease progression. These parameters and other availabel data were subjected to extensive univariate and multivariate analysis to assess their role as predictors of disease progression in this series of ESCC.

Material and methods of the study

Patients and samples: The material of this study was derived from e serie of 1876 oesophageal surgical specimens taken from a total of 700 patients, who underwent oesophageal resection for an invasive ESCC in Anyang Tumor Hospital, in Henan Province of China. All patients are from Linxian – the high risk area for ESCC in Northern China, where the age – adjusted mortality rates for this tumor are 161 males for 100 000 habitans, and 103 females for 100 000 habitans. ^(1, 2, 5) From

this cohort, cancer samples of 273 patients were subjected to quantitative image analysis and cytometry, from which 57 % males and 43 % females. The age of the patients ranged from 36 to 72 years, with a mean age 54, 8 years (SD 8, 7) in the males, and 55, 5 years (SD 8, 6) in the females. From each patient, surgical specimens were taken from a. the primary tumour; b. adjacent oesophageal mucosa; c, regional lymph nodes, d. as well as surgical resection margins.

Histopathology. Routinely processed, haematoxylin – eosine – stained sections were examined with light microscopy to confirm:

- The diagnosis of ESCC, to grade the intraepithelial lesions adjacent to carcinoma, (absent, mild, moderate, severe dysplasia - Intraepithelial Neoplasia of Oesophagus).
- To confirm or exclude the lymph node metastases.
- To evaluate the morphological evidence for HPV involvement, using the criteria by Syrjänen.

In positive cases, the HPV suggestive morphology was classified as papillary, flat or inverted. ^(6, 7, 8)

Histological grading of ESCC into three degrees (well, moderately, poorly differentiated), was initially performed by three pathologists based on criteria: a. nuclear polymorphism; b. degree of keratinisation, and c. mitotic activity.

HPV screening in Situ Hybridisation: All biopsies were analysed to HPV-DNA detection by screening in ISH, with biotin-labelled HPV cocktail probes (detecting a wide spectrum of HPV), under low-stringency conditions (Tm-35), as detailed previously. ^(5, 6, 7, 8) the hybridisation in situ signals were developed with nitroblue tetrazolium and bromo – chloro – indoxyl phosphate at 37° C for 2 hours.

HPV type specification in Situ Hybridisation: The cases HPV DNA positive samples on the ISH screening were further analysed by HPV type specific ISH using Biotin-labelled HPV DNA probes under highstringency conditions (Tm-17). The technique has been detailed before ^(5, 6, 7, 8). For HPV typing, the whole genomic DNA probes of HPV 6, 8, 11, 16, 18, 33 and 53, were biotinylated by nick-translation using a commercial kit, at the concentration of 1.0 mg/ml in the hybridization cocktail. CasKi cell smears, and formaline - fixed, paraffine - embedded biopsies which had previously been shown to contain HPV DNA sequences were used as positive controls in both the screening and type specific ISH. ^(5, 8, 10, 12)

Detection of HPV DNA by polymerase chain reaction (PCR): The presence of HPV DNA in the biopsies of our study was analysed with PCR using MY09/MY11L1 consensus primer sets: 5'-CGTV CC (A/C) A(A/G)(A/G)GGA (A/T)AC TGA TC-3', and 5'GC(A/C) CAG GG(A/T) CATAA(C/T) AAT GG3' All samples were tested initially using β -globin gene specific primers (5'-ACA CM CTG TGT TCA CTA GC-3', and 5'-CAA CTT CAT CCA CGT TCA CC-3'), which amplify a 100-bp region of β -globin gene. PCR was performed as previously described in detail from Villiers. (8, 12) A total of 35 cycles of amplification of the target sequences were carried out in 50 ml of a reaction mixture with the Gene Ampli Taq kit and the Perkin Elmer Cetus automated thermal cycler. The specific HPV DNA sequences amplified by the PCR were subsequently confirmed by Southern Blot Hybridization, with P-labelled HPV 6, 11, 16 and 18 DNA probes, under low-stringency conditions (Tim-35).^(4, 5, 9, 10, 12)

Image analysis: For quantitative image analysis, 6 μ m thick formalin-fixed, paraffine-embedded tissue sections were used, stained for DNA according to the Feulgen procedure.

The Feulgen stained histological slides were analysed using the LEICA Q500MC image analysis system (LEICA England), coupled with true colour CCD video camera (JVC – Japan) and Leica microscope.

The image cytometry was performed according to the consensus Report of the European Society of Analytical Cellular Pathology.^(4, 10)

Microscopic fields (4 to 6), under visual control, were chosen from multiple areas representative of the tumour sections, according to the following criteria: a. completeness of the cellular nucleus, assessed by focusing up and down; b. no over, or under lapping of neighbouring cellular nuclei; c. assertion that nuclei belong to the tumour cell population.^(4, 10)

Each microscopic field was stored at 512 x 512 pixel with 256 grey levels and measured using the Qwin's software (Leica). Approximately 150 to 300 cellular nuclei per field, with a total at least 450 per specimen, excluding lymphocytes, macrophages and fibroblasts. The following parameters were measured:

- A. *Morphometric*: 1. nuclear area, 2. perimeter, 3. length, 4. breadth, 5. convex perimeter, 6. roundness, 7. curve length, 8. curve width, 9. aspect ratio, 10. convex area, 11. equivalent diameter.
- B. *Densimetric*: 1. Mean Optical Density (MOD), 2. Integrated Optical Density (IOD), 3. Gray Variance. The DNA index (DI) was calculated as the ratio of the mean channel value of the G0-G1 peaks of the tumour cell population to that of the G0-G1 peak of diploid reference. The position of diploid channel was verified by examining the peak channel number produced by benign

lymphocytes that were present in each cases, so we are used as 100 – 150 lymphocytes as internal quality control.

In DNA – IMC, the mean channel value of the G0-G1 peak of the tumour nuclei was 24 whereas that of lymphocytes was 20, 8; the corresponding DNA index was 1, 14. Because of the small value of shift, we did not use any correction factor.
(4, 10)

A diploid tumour peak was defined as a single peak with a $DI = 1.00 \pm 2 \text{ SD}$ ($1 \pm 0, 15$), and non other peaks more 10 % of the total were present.

A aneuploid peaks was defined by the presence of a peak > 10 % of the total lying outside the diploid range, with a DI 1, 2 – 2, 0.

Tetraploid peaks were defined as a G2/M peak (4N) > 15 %, with a DI between 1, 85 – 2, 15.

Statistical analysis: Were performed using the SPSS computer program peckage (version 6. 1).

Frequence tables were analysed using Chi-square test, interpreting the Ch-square statistics, Fisher's exact test, Pearson's R, Spearman correlations and/or likelihood ratio were used to assess the significance of the correlation between the individual variables in univariate analysis.

Difference in the means of the morphometric vairables between the groups (Node +/Node –; and Tumour Grade 1/Grade 2); were analysed using the analysis of variance (ANOVA) models, with F statistics. The correletaion of different quantitative nuclear parametres to 1. Lympho node status, 2. HPV status and 3. Tumour Grade, were tested bu Mann-Whitney U test. Wilcoxon Rank sum W test, Kolmogorov – Smirnov 3 – sample test and/or by Kruskla – Wallis 1-way ANOVA test.

Multiple logistic multivariate models were used to analyse the indipendent prognostic value, of variables, using the stepwise backward approach. Removal testing was based on the probability of the likelihood ratio statistic. Both morphological variables shown to be significant in the univariate analyses were entered into the model, with $p = 0.10$ being the probability for stepwise removal and $p = 0.05$ the probability for stepwise entry.

Results

Histopathological analyses and HPV detection. Results of the histopathological analyses are included in Table 1, where the numbers of the total series and the cases subject to image analyses are shown separately.

| Characteristics | Number of cases | | per cent | |
|---|--------------------|--------------|--------------------|--------------|
| | Morphometry series | Total series | Morphometry series | Total series |
| Grade of ESCC | | | | |
| well differentiated | 105 | 198 | 38.5 | 28.3 |
| moderately differentiated | 89 | 357 | 32.7 | 51.0 |
| poorly differentiated | 79 | 145 | 28.8 | 20.7 |
| Ploidy | | | | |
| Diploid | 220 | | 80.2 | |
| Non diploid | 53 | | 19.8 | |
| Lympho node metastases | | | | |
| Present | 40 | 145 | 46.5 | 46.4 |
| Absent | 46 | 167 | 53.5 | 53.6 |
| Non information | 187 | 388 | | |
| Adjacent tissue present | 152 | 538 | 55.7 | 76.8 |
| Dysplasia in adjacent tissue | | | | |
| No | 101 | 246 | | |
| Mild | 7 | 21 | 4.6 | 5.7 |
| Moderate | 15 | 31 | 9.9 | 8.4 |
| Severe | 29 | 69 | 19.1 | 18.8 |
| HPV – suggestive changes in adjacent tissue | | | | |
| No | 129 | 322 | 85.4 | 88.2 |
| Papillary | 2 | 5 | 1.3 | 1.4 |
| Flat | 20 | 38 | 13.2 | 10.4 |
| HPV – suggestive changes in tumor tissue | | | | |
| No | 139 | 387 | 67.1 | 69.7 |
| Papillary | 24 | 69 | 11.6 | 12.4 |
| Flat | 11 | 16 | 5.3 | 2.9 |
| Endophytic | 33 | 83 | 15.9 | 15.0 |
| HPV detection by ISH | | | | |
| Positive | 49 | 116 | 22.5 | 18.9 |
| HPV detection by PCR | | | | |
| Positive | 3 | 66 | 1.4 | 15.2 |

From 700 carcinomas, 198 cases (28,3 %) were well differentiated, 357 cases (51.0 %) as moderately differentiated and 145 cases (20.7 %) as poorly differentiated. For the final analyses, well and moderately differentiated carcinomas, were combined as Grade 1, and poorly differentiated as Grade 2.

Regional lymph node metastases were identified in 145 cases (46.5 %) of the 312 patients.

All grades of dysplasia were observed in the adjacent tissues, albeit in the majority (33.0 %) of the available cases. Adjacent tissues also combined changes suggestive of HPV in a minority of cases (11.8 %)

Such HPV – suggestive morphological changes were detectable in 30.3 % of the primary tumours, covering all morphological variants of HPV (papillary, flat and inverted). HPV DNA was detected in 116 (18.9 %) of carcinomas. PCR positivity was of the same order of magnitude 15.2 % of the cases analysed. The agreement between ISH and PCR was calculated with the kappa – statistics (kappa 0.5803).

Results of image analysis. 273 cases (about 40 % of all ESCC) was examined to image analysis, using morphometry and densitometry. Table Nr. 2 gives the descriptive statistics of the parameters analysed. All these morphological variables were subjected to analyses by ANOVA models and non-parametric tests, to compare the means between the groups Node + / Node – cases, and to correlate these variables to lymph node status, also HPV status and tumour grade, respectively. In ANOVA tests, no statistically significant differences between Node + / Node – cases were disclosed in any of these parameters.

No significant correlations between the tested variables and three grouping variables could be found by the non – parametric test either. The DNA index (DI) was calculated as the ratio of the mean channel value of the G0-G1 peaks of the tumour cell population to that of the G0-G1 peak of diploid reference. DNA index was 1, 14. ^(4, 10)

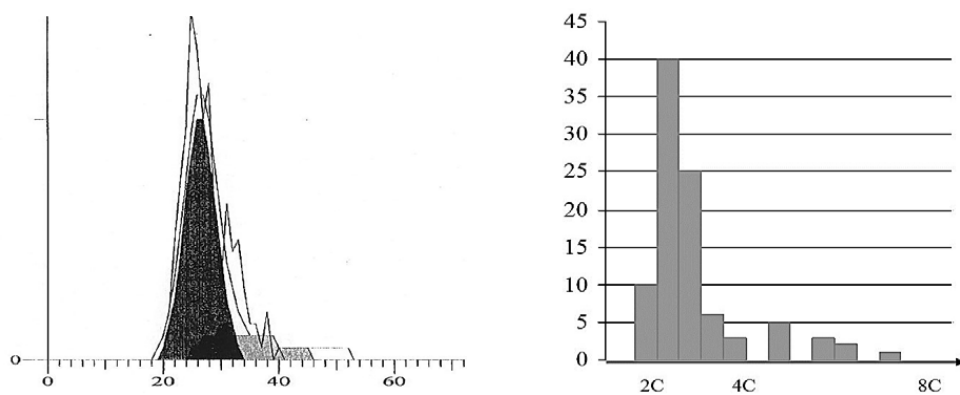


FIG. 1. Polynomial curve and histogram of DNA diploidy.

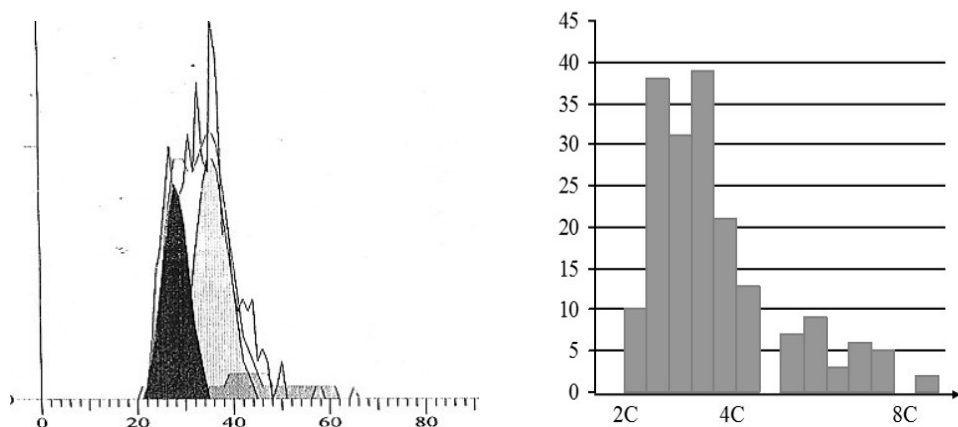


FIG. 2. Polynomial curve and histogram of DNA aneuploidy.

For all cases analysed in static cytometry were make the polynominal curve and histogram of DNA ploidy. - 52 cases (19,05 %) of ESCC are DNA diploidy ($p = 0.1$) (Fig. 1)

A diploid tumour peak was a single peak with a $DI = 1.00$, $SD (1 \pm 0.15)$, and non other peaks

> 10 % of the total were present.

- 221 cases (80, 95 %) of ESCC are DNA aneuploidy ($p = 0.12$) (Fig. 2) A aneuploid peaks was with the presence of a peak > 10 % of the total lying outside the diploid range, with a $DI 1.2 - 2.0$.

Tetraploid peaks were defined as a G2M peak ($4N$) > 15 %, with a DI between 1.85 - 2.15.

- Cells fraction in S - phase, from both ESCC dyploidy and ESCC aneuploidy were 32, 4 % ($SD \pm 18.3$).

- Cells fraction in phase G2 - M were 2,12 % ($p = 0.02$)

- Cells fraction in phase G0 - G1 were 66, 07 % ($p = 0.02$)

TABLE 2. Statistics of the parameters analysed by image analysis.

| Parameters | N° cases | Mean | Median | SD |
|---------------------|----------|-------------|-------------|------------|
| Index DNA | 272 | 1, 247 | 1, 210 | 0, 769 |
| G0-G1 | 272 | 66, 068 | 67, 010 | 20, 265 |
| G2-M | 272 | 2, 122 | 1, 370 | 2, 466 |
| S - phase | 261 | 32, 386 | 31, 160 | 18, 237 |
| Grey variance | 132 | 0, 014 | 0, 014 | 0, 040 |
| IOD | 272 | 111718, 905 | 110565, 000 | 20292, 141 |
| MOD | 273 | 0, 615 | 0, 609 | 0, 088 |
| Nuclear area | 273 | 48010, 000 | 47148, 000 | 6123, 433 |
| Aspect ratio | 273 | 1468, 703 | 1454, 000 | 124, 508 |
| Breadth | 273 | 6618, 956 | 6571, 000 | 489, 101 |
| Convex area | 273 | 53150, 447 | 51908, 000 | 7244, 374 |
| Convex perimeter | 273 | 25934, 817 | 25723, 000 | 1740, 177 |
| Curve length | 273 | 26765, 000 | 26765, 000 | 681, 836 |
| Curve width | 273 | 6533, 721 | 6550, 000 | 673, 416 |
| Equivalent diameter | 273 | 7747, 381 | 7689, 000 | 470, 829 |
| Fullnes Ratio | 132 | 0, 950 | 0, 952 | 0, 017 |
| Length | 272 | 9585, 756 | 9484, 000 | 743, 680 |
| Perimeter | 273 | 27401, 465 | 27164, 000 | 1787, 721 |
| Roudness | 273 | 1191, 956 | 1189, 000 | 49, 704 |

Univariate analysis. The variables analysed were tested for their significance as predictors of the lympho node status, HPV detection and tumour grade, using Chi-square test.

Lympho node status was significantly ($p = 0.01$) predicted by a number of nuclear variables: nuclear area, G0/G1 ratio, HPV DNA status, IOD, MOD and S-phase and with borderline significance ($p < 0.05$), also by the DNA – Index, G2/M, nuclear length, perimeter and roudness.

HPV status was predicted by full ratio, MOD and roudness ($p < 0.05$)

The grade of carcinoma was highly significantly associated with HPV – suggestive morphological changes ($p > 0.000001$) and significantly with MOD and nuclear roudness ($p < 0.01$)

Multivariate analysis. All variables show to be significant in univariate analysis were entered into the multiple logistic regression analysis, using the stepwise likelihood ratio model.

The three most significant ones ($p < 0.001$) are nuclear perimeter, nuclear roundness and its equivalent diameter. As the last step, all variables without significance in the univariate models, were individually entered into this "saturated" model.

Then, two additional factors proved to be independent, i. e., adjacent dysplasia and breadth of the nucleus, both with level $p < 0.05$. In that case, nuclear breadth replaced nuclear length in the model.

Discussion

The present study was a part of our multinational EC-funded project, started in the early 1990 in collaboration with European and Chinese authors to elucidate the role of HPV in oesophageal carcinogenesis.^(4, 5, 6, 7) Esophageal cancer is among the top ten most frequent malignancies worldwide, also in China remains one of the most common malignancies and has a high metastasis rate and poor prognosis.^(1, 2, 4, 5)

It's generally agreed that the most significant prognostic parameters are the pathological stage of the ESCC as defined by the TNM classification.^(3, 5, 6, 7, 8) Recently, attempts have been made to develop a variety of prognostic scores, shown to favourably compete with pT classification.^(3, 6)

On the other hand, traditional grading systems like that of the WHO, which are based on tumour differentiation, mitotic activity and nuclear abnormalities and proven to be of major, predictive value in many other carcinomas, have failed to yield unequivocal results as disease prognosticators in ESCC. This is mainly because of the inherent reproducibility problems associated with such classification.^(4, 5, 6, 7)

Indeed, this was shown to be the case in the present study where the histological grading into three classes proved to possess a low inter-observer variations and thus was replaced grading into categories.^(4, 9, 10, 11) Similarly, the reproducibility of the recently proposed prognostic score, based on assessment of inflammatory response, pattern invasion and nuclear polymorphism, has not been extensively tested in practice as yet.^(3, 4, 10, 13, 14, 15) The failure to run the Kaplan-Meier and Cox survival analysis precluded the testing of such a prognostic score in the present study. Due to the above reasons, the present study must rely on the lymph node status as a surrogate marker of disease progression. This information was used as the grouping variable to divide the patients into those with progressive (Node +), and less aggressive (Node -) disease.^(15, 16, 18)

The analysis then proceeded into the assessment of the significance of each individual variable as a predictor of 1. Lymph node status; 2. HPV status; 3. Grade of carcinoma.

As evident from Table Nr 2, a number of these variables do seem to process a good predictive power for the previous for the lympho node status and HPV status. Noteworthy, however, is the fact that the grade of the carcinomas (for 3° and 2° grade system), was no predictive value. This is consonant with the previous data on the limited value of histological grading in the evolution of prognosis of ESCC. (4, 10, 13, 14, 15, 16)

On the other hand, a number of interesting predictive variables were disclosed by these univariate analyses. In addition to nuclear area, G0-G1 ratio, IOD, MOD, S-phase, and HPV DNA status proved to be a significant predictor of lympho node metastases ($p = 0.006$).

The variable was created by combining the results of ISH and PCR, representing the overall detection rate of HPV in these samples. It has been previously shown that DNA static cytometry is of some predictive value in ESCC and the present results are in agreement with that notion.

In histopathological analysis, results that microscopic changes suggesting HPV were no prognostic value for ESCC in a low – incidence country as Finland (6), but this notion now seems to be true with the ESCC derived from high-incidence countrise as China, as well as shown by the failure of HPV – suggestive changes to predict disease progression in either univariate or in multivariate analysis. (5, 6, 7, 9, 12, 13)

Undoubtedly, the use of HPV testing by DNA technique as a prognostic factor of ESCC sounds an attractive option. Because of the lack of predictive value for the morphological grading, HPV DNA testing might offer an applicable means to evaluate the disease outcome in these patients. (5, 6, 7, 8, 9, 10). This approach may, however, be of limited values in countrise with a low-risk of this disease, where also the prvalence of HPV in these lesions seems to be significantly loer than in high-risk disease in China. (10, 13)

In this series, two intersting predictors of the HPV status were disclosed, MOD and nuclear roudness, which may be the surrogate markers of HPV – induced cytopathologic effects, e.g increased nuclear hyperchromasia (aneuploidy) and koilocytosis. (4, 10, 12, 19)

Better than any other variable, HPV – suggestive morphology seems to correlate in a highly significant manner with tumour grade in ESCC. Thus, changes suggesting HPV (16, 17) were almost invariably absent in poorly differentiated lesions but instead confined to highly – differentiated ones.

Notworthy, however, was the failure to find any mutual correlation between these morphological findings and HPV DNA detection ($p = 0.79$). This suggest that morphological assessment of HPV – suggestive morphological changes is not a highly reproducible means to classify the ESCC lesions as HPV – positive or negative, in contrast to lesions of the genital tract. (10, 13, 14, 18, 19)

This notion has been proposed before. Historically, morphology has been of importance as the first-line clue to HPV involvement in the lesions of ESCC. ^(5, 6, 12)

The univariate analysis clearly pinpointed a total of 12 variables with potential to be tested as independent predictors of ESCC progression in multivariate tests. When such an analysis was meticulously completed, nine of these variables remained in the model, when the limit of $p < 0.10$ was used as the criteria of backward removal. Of these nine variables, statistical significance ($p < 0.05$) was reached only by 4 variables (equivalent diameter, nuclear length, nuclear perimeter and nuclear roundness). Additionally, two predictors were disclosed among the variables not shown as significant in univariate analysis, i. e. adjacent dysplasia and nuclear breadth. The latter was interchangeable with the nuclear length in the model, which sounds logical. The role of adjacent dysplasia is also understandably feasible; any such change around the invasive lesions is probably a sign of a “field effect” in the oesophageal mucosa, where invasive disease seems to develop through well defined precursor lesions. ^(4, 20, 21, 22, 23, 24)

Presence of such precursors could be regarded as a sign of a more aggressive and potentially progressive of oesophageal squamous cell carcinoma. ^(4, 10, 16, 24)

Noteworthy, is the loss by the HPV DNA status, nuclear area, DNA index, and aneuploidy of their role as independent predictors of disease progression in the multivariate analysis. This is not unusual in this type of modeling, where in a variety of carcinomas, factors which look promising in univariate analysis lose their power in multivariate models. ^(4, 9, 27, 28, 29) This result, should eliminate the use of systematic HPV typing as a potential prognostic factor of ESCC. ^(6, 9, 12)

Our data indicated that morphological tumour grade is of limited value as a predictor of disease progression in ESCC, which is in agreement with the experience of other authors. ^(13, 15, 16, 26, 27)

In our study result, than using morphological assessment which suffer from lack of reproducibility, a quantitative image analysis (static cytometry), might have something to offer as a disease predictor in ESCC. A series of nuclear variables seem to predict disease progression in univariate analysis. Among these variables, the most significant independent predictors of disease progression were found in multivariate modelling as well. This notwithstanding, however, further work is urgently needed to uncover the basic pathogenetic mechanisms leading to ESCC, a major malignancy, which strictly uneven distribution on the globe and, as such, most probably also a divergent etiology. ^(4, 8, 9, 10, 11, 12, 27, 28, 29, 30)

Elucidating these mechanisms should pave the way to better prognosis of ESCC in the future.

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The Impact of Radon Gas on Pulmonary Cancer in Albania _____

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Abstract in English

This Article shows real cases of patients with Pulmonary Cancer admitted and treated in University Pulmonary Hospital of Tirana `Shefqet Ndroqi` during three last years : 2013-2014-2015. All data are confirmed from Statistics division of University Pulmonary Hospital of Tirana `Shefqet Ndroqi`. All data are compared with international standard data of potential possibilities of causing Pulmonary Cancer by gas Radon, in Albanian population during these three years of study to the smoking and non-smoking people.

Is known the importance of gas Radon to cause of Pulmonary Cancer to the smoking and non –smoking people.

As for internationally standard data, Pulmonary Cancer is caused by gas Radon in proportion of 3 people about 1.000 to the contingent to the smoking people, and in proportion of 0.7 people about 1.000 people to the contingent of non-smoking people.

All data extracted from statistics office of University Pulmonary Hospital of Tirana `Shefqet Ndroqi` during three last years : 2013-2014-201, are compared with 0.4 pCi/L(picocuri/liter) that is lowest level of gas Radon Concentration that can be potentially cause Pulmonary Cancer of 3/1000 to the smoking people and of 0.7/1000 non-smoking people.

This Article do presents differences about real patients with Pulmonary Cancer admitted and treated during years 2013-2014-2015 with Pulmonary Cancer can be caused theoretically in Albania population by Gas Radon to the smoking people and non smoking people.

Actually in Albania are not referred systematically data of gas Radon levels and do not have any official data about Risk of Pulmonary Cancer from gas Radon levels to the quarters and apartments where live the habitants .

Paediatric age is not included in this Study because in that age have found not any case of Pulmonary Cancer during these three years included in our study.

All cases, really and theoretically cases, are divided in two group-ages: 15-64 years and, above 65 years. Are represented really cases admitted in University Pulmonary Hospital divided in habitants from villages and from cities; represented all cases admitted in University Pulmonary Hospital divided in males and Females.

Are highlighted during years 2013-2014-2015 in Albania respectively 492-564-604 cases with Pulmonary Cancer, compared respectively with 2333.5-2451.8-2329.3 could be cases theoretically with Pulmonary Cancer, caused with lowest levels of gas Radon that cause Pulmonary Cancer to the smoking and non-smoking people as well.

Statistically have been big differences between really cases admitted in Hospital, and theoretically cases ($p < 0.001$) during three years.

Although differences between really Pulmonary Cancer of the women and theoretically Pulmonary Cancer caused by gas Radon were not significant ($p < 0.1$).

That does it mean that are various problems that influence in causing of Pulmonary Cancer by gas Radon and do cause statistically big differences between really cases and theoretically cases ($p < 0.001$). These various problems can be: delayed diagnostics of patients with Pulmonary Cancer, lack of gas Radon measure equipment, lack of data base of gas Radon levels of habitant area in Albania, etc.

Key Words: Pulmonary Cancer; Radon - ^{222}Rn ; 1 pCi/L=37 Bq/m³

(Picokryri, Bequerel - measuring unit).

Objectives

- The objectives of this study are related to the impact of Radon gas in causing Lung Cancer in smoking and non-smoking patients and those who have quit smoking.
- Evaluation of the impact of Radon gas on Lung Cancer by age groups 15 - 64 years and over 65 years, excluding the age group in which no cases of Pulmonary Cancer were found,
- Assessment of the damages caused by Gazi Radon noticing the hospitalized patients with Pulmonary Cancer in the Sanatorium Hospital from the city and from the village during the years 2013, 2014, 2015.
- Use of international standards in increasing the estimation of the number of patients with Pulmonary Cancer caused by Radon Gas in smokers and non-smokers, to determine the theoretical number of persons who may be affected by Lung Cancer in these two age groups based on the number exact population in the three years taken into study: 2013-2014-2015.

Background

Studies on the level of Radon gas in Albania are few. The only studies that have been done by Eng. Luan Qafmolla, engineer at the Institute of Nuclear Studies, Tirana, entitled `` Monitoring of Radon (^{222}Rn) Indoor Gas, Drinking Water and Soil'', Luan Qafmolla¹, Shyqyri Arapi², Safet Dogjani³), so they are made for Radon gas levels 222, in nuclear waste. The other study was conducted by a group of engineers from the Institute of Nuclear Studies in collaboration with doctors of the Institute of Public Health in 2003, entitled: (`` Results Of The National Survey On Radon indoors in Albania'' referring to the AIP conference (Conf Proc. 1203, 672 (2010); <http://dx.doi.org/10.1063/1.3322533>, Kozeta Bodea, Elida Bylykua, Florinda Cfarkua, Irena Mucollarib and Manjola Shytib. It has been noticed from these studies that the gas level of Radon 222 has increased levels in Tirana, Ballsh, and Çorovodë in relation to other cities measured with FRITRA-2 monitor.

The maximum levels allowed by the 'National Commission on Radiation Protection' based on EC / IAEA (European Union and International Atomic Energy Agency) documents for Radon gas are:

- for old dwellings up to: 400 Bq / m³ (Bequerel / m³)
- for new apartments up to: 200 Bq / m³ (Bequerel / m³)
- for the level of Radon gas in Water up to: 2.5 Bq / l - 10 Bq / l,
- for the level of Radon gas in the ground up to: 22.2 kBq / m³

US and Europe measure radon radioactive gas levels with different indicators: 1 pCi / L = 37 Bq / m³.

(Monitoring of Radon (222Rn) Indoor Gas, Drinking Water and Soil', Luan Qafmolla¹, Shyqyri Arapi², Safet Dogjani³).(' Measuring of Radon concentration in the Radioactive Centralaste Centralized Facility in Albania' in 2001, Luan Qafmolla)

In this paper, the level of Radon gas inside the apartments was estimated in 173 apartments in 10 areas of Albania for a period of 90 days, it was observed that the level of Radon gas fluctuated between 200-400 Bqm. Measured with the Radtrack detector performed by the Center for Applied Nuclear Physics. ("Results of The National Survey On Radon indoors in Albania" referring to the AIP conference (Conf. Proc. 1203, 672 (2010); <http://dx.doi.org/10.1063/1.3322533>, Kozeta Bode^a, Elida Bylyku^a, Florinda Cfarku^a, Irena Mucollari^b and Manjola Shyti^b),



A digital radon detector

Some Characteristics and Features of Radon Gas

25.¹ ``Monitoring of Radon (²²²Rn) Gas indoor, Drinking Water and Soil``, Luan Qafmolla¹, Shyqyri Arapi², Safet Dogjani³

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Radon is a radioactive gas found in nature which can be found in the indoor environment both at home and at work. Radon gas is one of the most important causes of Lung Cancer and Respiratory Cancer after the other most important cause that is smoking. Radon gas is estimated to cause around 3-14% of all Pulmonary cancers depending on its average level locally. Radon gas is more likely to cause Lung and Respiratory Cancer in non-smoking patients, but it is also the primary cause of Lung

and Respiratory Cancer in non-smoking patients. The lower the levels of Radon gas concentration, the lower the risks for Lung and Respiratory Cancer, but it is not yet known how low the level of Radon gas concentration should be in order not to cause Cancer.

Radon is the fifth radioactive element discovered in 1900 by Friedrich Ernst Dorn, after Uranium, Radium, and Polonium.

Radon gas is produced from the dissolution of Radium 226 which is found in Uranium ore, phosphate rocks, clay shales, metamorphic rocks such as granite, and ordinary rocks such as limestone.

Radon gas has no stable isotopes and has 36 isotopes that have atomic mass from 193-228. The most stable isotope is Rn222 which is the derivative of the decomposition of Ra226 and U238

Atmospheric Radon gas concentrations are measured in Becquerel per cubic meter Bq / m³, and SI, while in the US they are measured in picocuri per liter - pCi / L; 1 pCi / L = 37 Bq / m³.

Average domestic and indoor exposure is 48 Bq / m³ but varies; while outside the buildings are 15 Bq / m³ ..

Because the half-life of Radon gas is 3.8 days, removing or isolating the source would significantly reduce the risk within a few weeks. Another method of reducing gas levels is Radon modification of building ventilation. In general, the concentration of Radon gas inside buildings increases when their ventilation decreases. In a well-ventilated place, the concentration of Radon gas tends to reach the concentration that is found in buildings 10 Bq / m³ (1 to 100 Bq / m³). "A Citizen's Guide to Radon". www.epa.gov. United States Environmental Protection Agency. October 12, 2010. Retrieved January 29, 2012.

Brief Overview

Radon is a chemical element with the symbol Rn and atomic number 86, it is a radioactive gas, colorless (Sometimes it is green or red in the exhaust pipes. Sometimes it is green or red in the exhaust pipes.), Odorless, tasteless, produced naturally by the decay (dissolution) of Radium. Radium is the decomposition product of Thorium and Uranium which are the most common radioactive materials found on earth. It is a highly stabilized isotope and has a half-life of 3.8 days.

Table 1.

Periodic Table of the Elements

(<https://www.google.com/#q=mendeleev+periodic+table>).

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| Periodic Table of the Elements | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | IA | | | | | | | | | | | | 0 | | | | | | | |
| 1 | H | | | | | | | | | | | | | | | | 2 | | He | | | | | | | | | | | | | | | | |
| 3 | | Li | | | | | | | | | | | | | | 4 | | Be | | | | | | | | | | | | | | | | | |
| 11 | | Na | | | | | | | | | | | | | | 12 | | Mg | | | | | | | | | | | | | | | | | |
| 19 | | 20 | | 21 | | 22 | | 23 | | 24 | | 25 | | 26 | | 27 | | 28 | | 29 | | 30 | | 31 | | 32 | | 33 | | 34 | | 35 | | 36 | |
| K | | Ca | | Sc | | Ti | | V | | Cr | | Mn | | Fe | | Co | | Ni | | Cu | | Zn | | Ga | | Ge | | As | | Se | | Br | | Kr | |
| 37 | | 38 | | 39 | | 40 | | 41 | | 42 | | 43 | | 44 | | 45 | | 46 | | 47 | | 48 | | 49 | | 50 | | 51 | | 52 | | 53 | | 54 | |
| Rb | | Sr | | Y | | Zr | | Nb | | Mo | | Tc | | Ru | | Rh | | Pd | | Ag | | Cd | | In | | Sn | | Sb | | Te | | I | | Xe | |
| 55 | | 56 | | 57 | | 72 | | 73 | | 74 | | 75 | | 76 | | 77 | | 78 | | 79 | | 80 | | 81 | | 82 | | 83 | | 84 | | 85 | | 86 | |
| Cs | | Ba | | *La | | Hf | | Ta | | W | | Re | | Os | | Ir | | Pt | | Au | | Hg | | Tl | | Pb | | Bi | | Po | | At | | Rn | |
| 87 | | 88 | | 89 | | 104 | | 105 | | 106 | | 107 | | 108 | | 109 | | 110 | | 111 | | 112 | | 113 | | | | | | | | | | | |
| Fr | | Ra | | +Ac | | Rf | | Ha | | Sg | | Ns | | Hs | | Mt | | 110 | | 111 | | 112 | | 113 | | | | | | | | | | | |
| * Lanthanide Series | | 58 | | 59 | | 60 | | 61 | | 62 | | 63 | | 64 | | 65 | | 66 | | 67 | | 68 | | 69 | | 70 | | 71 | | | | | | | |
| | | Ce | | Pr | | Nd | | Pm | | Sm | | Eu | | Gd | | Tb | | Dy | | Ho | | Er | | Tm | | Yb | | Lu | | | | | | | |
| * Actinide Series | | 90 | | 91 | | 92 | | 93 | | 94 | | 95 | | 96 | | 97 | | 98 | | 99 | | 100 | | 101 | | 102 | | 103 | | | | | | | |
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Like all other intermediate elements of dissolution chains, Radon gas is easily inhaled. Thus Radon gas occurring in the environment is responsible for most public exposures to radioactive ionization. This is the single largest contributor of the individual dose to the individual and is highly variable as the dose varies from country to country. Despite the short half-life, some of the Radon gas obtained from natural decomposition pathways can accumulate in higher concentrations than normal inside buildings, especially in the lower parts of buildings, such as foundations, lower floors of the building, due to its density. This can also happen in waters when water comes from terrestrial sources, such as some spring water or hot springs.

Epidemiological data have clearly shown a link between inhalation of high concentrations of Radon gas and the incidence of Pulmonary Cancer. Thus Radon gas is considered the most significant pollutant that affects the air quality inside the building and home worldwide.

According to the US Environmental Protection Agency (EPA), Radon gas is the second most common cause of Lung Cancer after Smoking. 21,000 people in the US die of Pulmonary Cancer each year from smoking, and 2,900 people from Non-Smoking Lung Cancer (<https://en.wikipedia.org/wiki/Radon>).

Accumulation in Buildings.

Typical exposures to settlements and inside buildings are approximately 100 Bq / m³ (2.7 pCi / L) of Radon gas. Radon enters buildings directly from the ground (ground) through the lower levels of the building that is in contact with the ground. High levels of Radon in water supply devices can increase the level of Radon gas in the air of homes. Typical Radon gas entry points inside buildings are cracks in the solid foundations of the building, at the connecting points of structures, cracks and gaps around service pipes, cavities inside walls and water supply equipment. Radon gas concentrations in the same localization can also vary within the 1 hour period by different factors. Also the concentration of Radon gas in a room of a building can be very different from the concentration in the neighboring room. (Toxicological profile for radon, Agency for Toxic Substances and Disease Registry, U.S. Public Health Service, in collaboration with U.S. Environmental Protection Agency, December 1990).

Table 2 Data from Existing Reports.

| Concentration Scale | | Examples of Radon Gas |
|-------------------------|--------|--|
| Concentration in Nature | | |
| Bq/m ³ | pCi/L | |
| 1 | ~0.027 | Concentration of Radon gas on the shores of the oceans-1 Bq/m ³ . |
| | | Concentration of Radon gas traces over the ocean and over the Antarctic -0.1 Bq / m ³ . |
| 10 | 0.27 | Radon gas concentration in outside air -10 to 30 Bq / m ³ .. |
| | | Based on observations Global Radon gas concentration around homes -39 Bq / m ³ . |
| 100 | 2.7 | Typical home concentrations in many countries have adjusted to -200–400 Bq / m ³ . When the reference level is 4 picocuries radon per liter of air (150 Bq / m ³), then actions are unnecessary. A continuous exposure of 230 Bq / m ³ for a period of 1 year corresponds to 1 WLM (monthly working level) . The allowed |
| | | |

| | | |
|-------------------------|-------------------------|---|
| | | concentration in Uranium mines is 1,220 Bq / m ³ (33 pCi / L) |
| 1,000 | 27 | Very high concentrations (> 1000 Bq / m ³) that are found in houses built with and that has uranium up to 20 picocuries radon per liter of air (800 Bq / m ³) or even higher, then the homeowner needs said to take measures to remove Radon gas. |
| 10,000 | 270 | Air concentrations in unventilated galleries such as Gastein Healing Gallery reach up to 43 kBq / m ³ (about 1.2 nCi / L) with a maximum value of 160 kBq / m ³ (about 4.3 nCi / L). |
| 100,000 | ~2700 | About 100,000 Bq / m ³ (2.7 nCi / L) has been found in Stanley Watras foundations. |
| 1,000,000 | 27000 | Concentrations reaching 1,000,000 Bq / m ³ are found in unventilated Uranium mines |
| 5.54 × 10 ¹⁹ | ~1.5 × 10 ¹⁸ | <i>Theoretical Limit of Radon Spirum Gas is: (222Rn) at 100% concentration (1 atmosphere, 0 ° C); 1,538 × 10⁵ curies / gram; 5.54 × 10 Bq / m³.</i> |

(Zdrojewicz, Zygmunt; Strzelczyk, Jadęga (Jodi) (2006). "Radon Treatment Controversy, Dose Response". Dose-Response. 4 (2): 106–18. doi:10.2203/dose-response.05-025.Zdrojeicz. PMC 2477672 . PMID 18648641.)

(Toxicological Profile for Radon, Table 4-2 (Keith S, Doyle JR, Harper C, et al. Toxicological Profile for Radon. Atlanta (GA): Agency for Toxic Substances and Disease Registry (US); 2012 May. 4, CHEMICAL, PHYSICAL, AND RADIOLOGICAL INFORMATION.) Retrieved 2015-06-06).

Recognition of Radon gas as a source of Disease and Cancer.

As early as the 16th century, Paracelsius and Agricola described it as a chronic disease in miners. In 1879 at a miners' inspection in Schneeberg Germany, Hertin and Hesse identified these diseases in miners as Lung Cancer (ATSDR 2008). After 1970, Radon and its derivatives were widely

recognized as a potential problem in Europe and Scandinavia as a source for Lung Cancer (NIOSH).

Dose of Radon That May Cause Lung Cancer

The EPA (US Environmental Protection Agency) estimates that exposure to high values of Radon is one of the leading causes of death in the US.

The EPA estimates that the recommended guidelines for the risk of Lung Cancer due to Radon exposure are 4 pCi / L (1 pCi / L = 37 Bq / m³).

This dose in the environment or in water causes Lung Cancer in:

- 1% of non-smokers
- 3% for those who have quit smoking
- 5% for smokers

These estimates may vary Group at-risk populations. In assessing the risk from Radon at home or in offices with the same concentrations, one should look not only at the accessories but also their way of life. For example, higher levels of Radon are found on the lower floors of houses. (Radon Toxicity: Who is at Risk ?, Agency for Toxic Substances and Disease Registry, 2000).

Consequences on Human Health

Ionizing radiation causes the formation of free radicals which cause genetic damage and cell damage which increase the rates of morbidity including Cancer.

The decay products of Radon 222 (Rn 222) are classified by the International Agency for Research on Cancer (IARC) as a carcinogenic agent in humans, and as a gas that can be inhaled causes cancer. of lungs especially in people exposed to increased concentrations over stable periods of time

("Known and Probable Carcinogens". American Cancer Society. Retrieved 2008-06-26).

Lung Cancer ranks first in terms of Cancer deaths in general. Among Non-smokers Lung Cancer is the No.1 cause of death.

| Three main Causes of death from Lung Cancer | | | |
|---|-----|-------------------|-----|
| Men | | Women | |
| Lung Cancer | 33% | Lung Cancer | 24% |
| Prosthate Cancer | 12% | Prosthate Cancer | - |
| Colorectal Cancer | 10% | Colorectal Cancer | 11% |

Lung Cancer is the deadliest cancer of all Cancers - survival up to 5 years is 10% -14%.

([Http://www.radonseal.com/radon-health.htm](http://www.radonseal.com/radon-health.htm)).

The most intense radiation from Radon derivatives occurs within the first hours when Polonium and Bismuth are rapidly decomposed into Radioactive Bullet-210, and then continue at a slower decay until Bullet2016. ½ the life of these nucleotides is over 22cjet, If a person is exposed to Radon 75% of its derivatives in the lungs lead particles will become harmless after 44 years. When alpha particles damage the cell, it takes a minimum of 5 years and in many cases 15-20 years or more to transform this cell into Pulmonary Cancer. population. Lung Cancer studies have therefore been done in miners exposed to Radon and in radiological research, animal research, and cellular research.

Only a few people exposed to Radon will develop Lung Cancer, but the risk of Cancer can in some cases last a lifetime. Children and young people are more at risk of developing cancer during their lifetime.

Ways to Eliminate Radon Ionizing Radiation

The main ways to reduce the amount of Radon gas accumulation in the home are:

- Increased Ventilation in the lower basal and underground pillars of the building;
- Improving the ventilation of the house and avoiding the transportation of Radon Gas from the basement to the rooms of the house,

-Installing the crankcase system (suction pump) for Radon Gas in the basement of the house

-Installing positive pressure or a device with positive ventilation systems. According to the EPA (US Environmental Protection Agency), the method of reducing Radon Gas `` primarily remains the ventilation system and the fans that draw Radon gas from the basement of the house and the basement and take it out, which is called active sub-slab depressurization, active soil depressurization.

("A Citizen's Guide to Radon". Wwww.epa.gov. United States Environmental Protection Agency. October 12, 2010. Retrieved January 29, 2012.)

List of Occupations Endangered by Radon Exposure

- Excavators
 - places where fish grow
 - Miners
 - hospitals
 - Natural caves
 - Natural gas and oil pipelines
 - Warehouses where nuclear waste is stored
 - Oil Refineries
 - Phosphate fertilizer plants
 - Fossil waste plants (combustion products are released into the air)
 - Radium contaminated sites with Radium
 - Underwater tunnels and tunnels in general
 - Water treatment plants (in moments during ventilation
- (EPA 2003; Field 1999; Fisher et al. 1996)

Risku ndaj Kancerit të Pulmonit

Risku i Kancerit Pulmonar nga ekspozimi ndaj Radonit vlerësohet midis 10-20 herë tek personat të cilët janë duhan pirës të krahasuar me ata që nuk janë duhanpirës.

Radoni mund të shkaktojë rreth 14% të numrit të pacientëve me Kancer Pulmoni (EPA 2009b).

Sipas OBSH (WHO 2005) Kanceri i Pulmonit i shkaktohet nga Radoni përfshin nga 6%-15% të numrit të pacientëve me Kancer Pulmoni.

Sipas Këshillit Kombëtar të Akademise së Shkencave Natyrore, arrin në përfundimin se Radoni është shkaku i dytë madhor i Kancerit të Pulmoneve pas Duhanit (NAS 1999) dhe (NRC 1999; EPA 2003).

Risku tek Fëmijët të ekspozuar ndaj duhanit është rreth 20 herë më i lartë se tek të rriturit.

Risku tek fëmijët të Ekspozuar ndaj Radonit është rreth dy herë më i lartë se tek të rriturit ndaj të njëjtës dozë. (NRC 1999; Darby 2005; Krewski et al 2005).

Njerëzit që jetojnë në shtëpi që nuk ajrosen dhe nuk largohen ndotësit dhe nuk dalin për shkak të pamundësisë, janë më të rrezikuar nga Radoni.

Risk-u i Kancerit të Pulmonit për shkak të ekspozimit ndaj Radonit është 10-20 herë më i madh tek njerëzit që janë duhanpirës të krahasuar me ata që nuk janë duhanpirës

(<http://www.atsdr.cdc.gov/csem/csem.asp?csem=8&po=7>)

Afërsisht 1 në 15 shtëpi në SHBA ka nivele Radoni mbi ato të rekomanduara nga OBSH dhe EPA, pra 4 picocuries per liter (pCi/l) (148 Bq/m³) (EPA (February 2013). "Radiation information: radon". EPA.)

Mechanism of Cancer Radon Action in the Body.

Once Radon gas is inhaled from the lungs, it is easily digested in the blood and circulates throughout the body until it is expelled from the body through the lungs or skin. Because ½ the life of Radon 222 is 3.8 days many Radon atoms leave the body before they disintegrate.

Most harmful due to radioactivity are Radon atoms that decompose into radioactivity and the so-called

Radon 'daughters' derived from the metal particles of Lead, Polonium, and Bismuth. The accumulated radioactivity in the airways is in direct proportion to the levels of Radon at the level of 4 pCi / L, so about 600,000 particles are trapped in the lungs every hour.

34. "A Citizen's Guide to Radon". www.epa.gov. United States Environmental Protection Agency. October 12, 2010. Retrieved January 29, 2012.

- (EPA (February 2013). "Radiation information: radon". EPA.)
- 12.U.S. Environmental Protection Agency (January 2009). A Citizen's Guide to Radon: The Guide to Protecting Yourself and Your Family From Radon. Retrieved October 18, 2011.
- 13.Radon Toxicity: Ėho is at Risk?, Agency for Toxic Substances and Disease Registry, 2000.
- 14.Proctor, Robert N. The Nazi Ėar on Cancer. Princeton University Press, 2000 p. 99 ISBN 0691070512.
- 15.Edelstein, Michael R., Ėilliam J. Makofske. Radon's deadly daughters: science, environmental policy, and the politics of risk. Roĕman & Littlefield, 1998, pp. 36–39 ISBN 0847683346.
- 16.Samet, J. M. (1992). "Indoor radon and lung cancer. Estimating the risks". The Western journal of medicine. 156 (1): 25–9. PMC 1003141 . PMID 1734594.
- 22.Ministry of Health Albania, `Global Youth Tobacco Survey` CDC,who, 2007, Tirana, Albania

**Table 4 Radon Risk Assessment for smokers and non-smokers
(Modified from EPA 2009)**

| Level of Radon | If 1,000 persons who are smokers would have been exposed to these levels of Radon during their lifetime then.... | - What to do: - - Stop smoking - - And |
|-----------------------|---|--|
| 20 pCi/L | About 260 persons can be with Lung Cancer | Tidy up your Home |
| 10 pCi/L | About 150 persons can be with Lung Cancer | Tidy up your Home |
| 8 pCi/L | About 120 persons can be with Lung Cancer | Tidy up your Home |

| | | |
|------------------|--|---|
| 4 pCi/L | About 62 persons can be with Lung Cancer | Tidy up your Home |
| 2 pCi/L | About 32 persons can be with Lung Cancer | Consider adjusting the house to 2 and 4 pCi / L |
| 1.3 pCi/L | About 20 persons can be with Lung Cancer | Adjusting the house to the 2 pCi / L level is difficult |
| 0.4 pCi/L | About 3 persons can be with Lung Cancer | Adjusting the house to the 2 pCi / L level is difficult |
| 0 pCi/L | Calculated Lack of Risk | Impossible to adjust because they are equal to Radon levels outside in the environment. |

| Level of Radon | If 1,000 non-smokers would be exposed to these levels in their lifetime, then | WHAT TO DO: Avoid smoke and... |
|-----------------------|--|---------------------------------------|
| 20 pCi/L | About 36 people may have Cancer | Tidy up your Home |
| 10 pCi/L | About 18 people may have Cancer | Tidy up your Home |

| | | |
|------------------|---|---|
| 8 pCi/L | About 15 people may have Cancer | Tidy up your Home |
| 4 pCi/L | About 7 people may have Cancer | Tidy up your Home |
| 2 pCi/L | About 4 people may have Cancer | Consider adjusting the house to 2 and 4 pCi / L |
| 1.3 pCi/L | About 2 people may have Cancer | Adjusting the house to the 2 pCi / L level is difficult |
| 0.4 pCi/L | On average less than 1 person (0.7) may have Lung Cancer | Adjusting the house to the 2 pCi / L level is difficult |
| 0 pCi/L | Calculated Lack of Risk | Impossible to adjust because they are equal to Radon levels outside in the environment. |

(Lifetime risk of lung cancer deaths from EPA Assessment of Risks from Radon in Homes (EPA 402-R-03-003).

** Comparison data calculated using the Centers for Disease Control and Prevention's 1999-2001 National Center for injury Prevention and Control Reports.

* Lifetime risk of lung cancer deaths from EPA Assessment of Risks from Radon in Homes (EPA 402-R-03-003).

** Comparison data calculated using the Centers for Disease Control and Prevention's 1999-2001 National Center for injury Prevention and Control Reports).

(<https://www.epa.gov/radon/health-risk-radon>).

Pulmon deposition depends on whether the particles are attached to the dust or tobacco or loose. The latter are deposited deeper in the Pulmon, and this explains the type of Radon-induced deep lung cancer in non-smokers.

Radon daughter particles emit alpha and beta and gamma radioactivity. Alpha particles do not penetrate more than 1 mm deep into the tracheo-bronchial and Pulmonary tree and mainly into epithelial cells. The ionizing radiation concentration of heavy alpha particles is more damaging and explains more than 85% of Pulmonary damage.

Daughter particles that emit beta radiation go even deeper into the body up to 1-2 cm deep into human tissue.

Daughter particles that emit Gamma rays have more energy than x-rays and pass throughout the body to the outside of the body. As they are distributed throughout the body they have less concentration and consequently are less harmful.

Carcinogens cause damage to chromosomes and DNA molecules contained in the cell nucleus. Even an alpha particle can cause great damage to the genome that DNA of the cell including mutations and transformations. In this case it can be said that there is no dose of harmless Radon. The passage of an alpha particle has the potential to induce a cancerous growth of the cell which the particle does not kill directly because it does not enter the cell, but by damaging the surrounding environment the alpha particle produces chemical radicals inside the cell which damage DNA.

Other diseases caused by Radon.

Radon's radioactive daughter particles have been observed to occur in concentrations 10 times higher in non-smokers with Alzheimer's and Parkinson's disease than in people who have not had a history of past neurological disease.

It has been observed that the geographical distribution of mortality from Parkinson's is higher in US states that have high Radon potential.

However the Risk is much lower than Lung Cancer.

In cases of taking Radon by the gastrointestinal tract. It has been observed that there are also cases of Stomach cancer. In the US there are 20 deaths from Stomach Cancer per year which is 1,000 times lower than mortality for Lung Cancer

Treatment. Lung Cancer treatment is done only with surgery. Without surgery the disease is incurable.

Survival after 5 years is 10-15%. <http://www.radonseal.com/radon-health.htm>.

The most common physiologically pathological type of Lung Cancer was adenocarcinoma in both smokers and non-smokers.

Purpose of the Study

This study aims to highlight the dangers of Radon Gas in causing Lung Cancer in both non-smokers and non-smokers and non-smokers and to note the ratio of hospitalization of patients with Radon-induced Lung Cancer with the number of Lung Cancer patients who smoke and who have smoked but quit smoking.

This study considers patients with Pulmonary Cancer thought to be caused by Radon222 gas in relation to Lung Cancer caused by smoking, relying mainly not on direct measurement of Radon gas but on the possibilities of causing Radon Pulmonary Cancer in Albania according to scientific information on the risk of causing Pulmonary Cancer by Radon Gas.

Patients and Materials

Inpatients with Dg. Lung Cancer in the last three years 2013, 2014, 2015. Statistical materials are taken from the data of the University Hospital (Pulmonary Diseases) 'Shefqet Ndroqi', Tirana.

In these data confirmed by the University Hospital of Pulmonary Diseases, I divided the patients into three main age groups, excluding the child age group 0-15 because with this diagnosis there were no hospitalizations: 15-44 age group which is the youngest age and more productive at work, middle age group 45-64 middle age group but also

productive at work, and the period when menopausal physiological changes begin for women and andropause for men which may affect the increase of morbidity; and the third age group of old age over 65 in which morbidity and mortality increases to Cancer of any kind even more so and to Lung Cancer.

Characteristic was that there were no patients under 15 with Dg. Lung Cancer.

For 2013, a total of 492 inpatients were included in the study and of these according to the table were 412 males and 80 females; divided according to three main age groups 15-44 years old 45-64 years old and over 65 years old, were hospitalized respectively with Dg. Pulmonary Cancer: 25 men and 3 women, 208 men and 39 women and 179 men and 38 women. For 2014 were taken in study with Dg. Pulmonary cancer had a total of 564 patients, of whom 468 male and 96 female patients were hospitalized. Of these, according to the age group 15-44 years old, 45-64 years old, and over 65 years old, respectively, were hospitalized: 13 males and 7 females, 207 males and 45 females, and 248 males and 44 females.

For 2015 were taken in study with Dg. Lung Cancer A total of 604 patients were admitted to the University Hospital for Pulmonary Diseases and of these 502 patients were male and 102 patients were female; Of these, according to the age group 15-44 years old, 45-64 years old, and over 65 years old, respectively, the hospitalizations are presented in the following figures respectively: 11 males and 2 females, 119 males and 23 females, and 205 males and 47 females.

According to the written anamnesis in these patients the vast majority of these patients were smokers, but the data that were from the cards were incomplete. For this reason we have relied on this paper in the international data of persons affected by Lung Cancer due to smoking.

Methods

The patients included in the study are patients with Pulmonary Cancer Diagnosis with the relevant code (iCD-9 -162), hospitalized in the University Hospital (Pulmonary Diseases) 'Shefqet Ndroqi', during the last three years, ie the years: 2013, 2014 2015.

The number of patients and their cards have been verified through the assistance provided by Dr. Sofiela Telo, Statistician of the Statistics

Archive of the University Hospital (Pulmonary Diseases) 'Shefqet Ndroqi.

Given that 86% of patients with Lung Cancer are caused by smoking according to international studies: while other causes are:

- Exposure to Raddon gas 6% -13%
- While Exposure to certain other chemicals, household clothing or various asbestos appliances, Air Pollution, Previous Pulmonary Diseases Past Cancer Treatments, decreased immunity - occupy about 1-8% of Lung Cancer cases.

(<http://www.cancerresearchuk.org/about-cancer/type/lung-cancer/about/lung-cancer-risks-and-causes#lLYExA7gLLMgzcG7.99>)

(<http://www.cancerresearchuk.org/about-cancer/type/lung-cancer/about/lung-cancer-risks-and-causes>)

(<https://www.drugs.com/health-guide/adenocarcinoma-of-the-lung.html>).

This study is based on statistical data obtained from the University Hospital of Pulmonary Diseases and some international data on which the paper is based to achieve comparative results and relevant conclusions.

In table no. 1, Radon Gas is presented in Mendeleev's Table (Periodic Table of the Elements) in which it occupies the place No. 86 with yellow color, without color without taste, and inert gas.

In table no. 2, shows the degree of concentration of Radon gas in Nature measured in Bq / m³ - becquerel per / m³, or in pCi / L - picokyril / liter. This table shows that the highest concentrations of Radon gas are found in the Uranium mines -1,000,000 Bq / m³, and the lowest concentrations are found in the Antarctic surface - 0.1 Bq / m³.

In table no. 3, there are three most dangerous types of Cancer in Men and Women where the first place for Mortality is Pulmonary Cancer where one of the most dangerous factors in causing it is Radon Gas.

In table no. 4, entitled `` Radon Gas Risk Assessment for smokers and non-smokers (Modified from EPA 2009), has the basic international data on which the theoretical data are built which show the possibilities of affecting the population from Lung Cancer from the concentration of Radon gas in Dwellings. The lowest chance of causing Lung Cancer from Radon Gas to Smokers and non-smokers according to the table taken

as standard given in this study is 0.4 pCi / L and at this level of Radon gas concentration can get Pulmonary Cancer -3 people smoking per 1000 inhabitants; while according to the table can get Pulmonary Cancer - 0.7 non-smokers per 1,000 inhabitants. Below these levels, for both smokers and non-smokers it is impossible to cause Lung Cancer but the cause cannot be ruled out if the influence of this radioactive gas is prolonged over time or increases over different periods of time.

Also in this table it can be seen that levels at 20 pCi / L (and more) in smokers can cause Lung Cancer up to 260 people per 1,000 inhabitants; while in non-smokers the same levels, ie 20 pCi / L (and more) can cause Lung Cancer in 36 people per 1,000 inhabitants.

Also in this table with international standard data are given recommendations on how to increase the increased level of Radon from the minimum 0.4 pCi / L that causes Lung Cancer, a level which is taken as a comparative base level in this paper and up to high levels 20 pCi / L (and more) which capture large contingents of the population.

20.Dr. Roland Shuperka, Prof. Klement Shteto, WHO, 2001, 'Tobacco is the Big Killer', I.SH.P. Tirana

21.WHO, 'Screening Test for Substance Use Tobacco, Alcohol, Drugs, ASSIST', 2010,

17.Dr. Sofiela Telo, Statistician of the Statistical Archive of the University Hospital (Pulmonary Diseases) 'Shefqet Ndroqi.

23.Biological Effects of ionizing Radiation VI report, Health Effects of Exposure to Radon (NAS 1999, and (NRC 1999; EPA 2003)

In tables no. 5-6-7-8-9 (as will be analyzed below), the number of patients by age group, by urban and rural residence, the number of patients operated on for Lung Cancer in relation to the operated patients in the surgery of the University Hospital of Pulmonary Diseases (Sanatorium) which are taken in the study, as well as the number of inhabitants of the Republic of Albania in 2013, 2014, 2015, and the percentage of the most affected age groups and treated in hospital for Cancer Pulmonary, and the theoretical possibility of Pulmonary Cancer from the effect of Radon gas based on the standards of probability of

affect of residents by age groups taking into account smokers and non-smokers in the Republic of Albania in all three years.

These data are presented in more detail in tables no. 10-11-12-13. Table No.10 and Table No.11 present comparative data in relation to the population aged 15-64 and over 65 in relation to two international indicators as a minimum of Radon gas per 1000 inhabitants, in residential buildings which can cause Lung Cancer (minimum is 0.4 pCi / L), which in cases of smokers can cause Lung Cancer in 3 inhabitants per 1000 inhabitants and in cases of non-smokers can cause Lung Cancer in 0.7 inhabitants per 1000 inhabitants (this can be seen in Table No. 4). In table no. 12 and 13, it is noticed the total theoretical impact from Lung Cancer on male smokers and non-smokers based on international standards could be according to table No.12 in both age groups together is respectively: 2110 / 224.5 (2333.5) -2013 , 236 / 2210.8 (2451.8) -2014, and 262.5 / 2066.8 (2329.3) -2015.

Full Description of Materials and Patients

Having no exact data on patients with Dg.Pulmonary Cancer caused by Radon gas we have used the deductive method to find persons with Dg. Lung Cancer caused by Radon gas. Based on international data, standard standards for causing Pulmonary Cancer in smokers and non-smokers from Radon gas in Albania, comparing them with real data extracted from the archive of the University Hospital of Pulmonary Diseases (Sanatorium).

The main data come from the foreign literature which mentions that Treatment of Lung Cancer caused by Radon and in smokers is done only with Surgery. Without surgery the disease is incurable. Survival after 5 years is 10-15%.

(<http://www.radonseal.com/radon-health.htm>. (Krewski D, Lubin JH, Zielinski JM, et al. A combined analysis of North American case-control studies of residential radon and lung cancer. Journal of Toxicology and Environmental Health, Part A 2006; 69 (7): 533–597).

In extracting the results we are based on the data of the literature and the data obtained from the Pulmonary Diseases Hospital (Sanatorium) for the years 2013-2014-2015, presented in tables no. 1, 2, 3, 4, 5, 6, 7, 8.

These scientific data on the Risk of Lung Cancer caused by Radon Gas in non-smokers and smokers are as follows.

Given that according to the EPA,

- The risk of Lung Cancer for smokers is about 90% (86%), or from 62 people in 1000 population will die from Lung Cancer,
- The risk of Lung Cancer for non-smokers but also due to the synergistic effects between Radon gas and Tobacco, is in relation to 7 people in 1000 population will die from Lung Cancer ("A Citizen's Guide to Radon". Wwww. epa.gov. United States Environmental Protection Agency (October 12, 2010. Retrieved January 29, 2012),
- According to WHO (WHO 2005) Radon Cancer Caused by Radon includes from 6% -15% of the number of patients with Lung Cancer,
- While according to EPA, Radon can cause about 14% of the number of patients with Lung Cancer (EPA 2009b).
- The risk of Lung Cancer due to exposure to Radon is 10-20 times higher in people who are smokers compared to those who are not smokers (<http://www.atsdr.cdc.gov/csem/csem.asp?csem=I=8&7>).
- Approximately 1 in 15 homes in the US has Radon levels above those recommended by WHO and EPA, ie 4 picocuries per liter (pCi / l) (148 Bq / m³) (EPA (February 2013). "Radiation information: radon". EPA). This study is based on the above data, taking the lowest possible level of Radon gas that can cause Lung Cancer:
- to non-smokers level which according to table no. 4 is: 0.4 pCi / L, less than 1 person (0.7) may have Lung Cancer,
- to smokers according to tables no. 4 is: 0.4 pCi / L, 3 people can have Lung Cancer per 1000 people.

Making the necessary calculations based on people with cancer hospitalized in 2013, 2014 2015, we can note these results as follows.

In the following table No.9, the population of the Republic of Albania for the three years under review is presented: the year 2013-2014-2015 as well as the population of the age group 15-64 years and over 65 years for the three years. Age 0-15 years has not been considered because there has been no case of Lung Cancer in this age group for these three years.

These data are taken from the Statistical Yearbook of INSTAT for the respective years 2013-2014-2015 corrected from the Mundi index and cia world factbook data as follows. The argument is that without knowing an

accurate statistical data no accurate results can be drawn for the impact of Radon gas on this article.

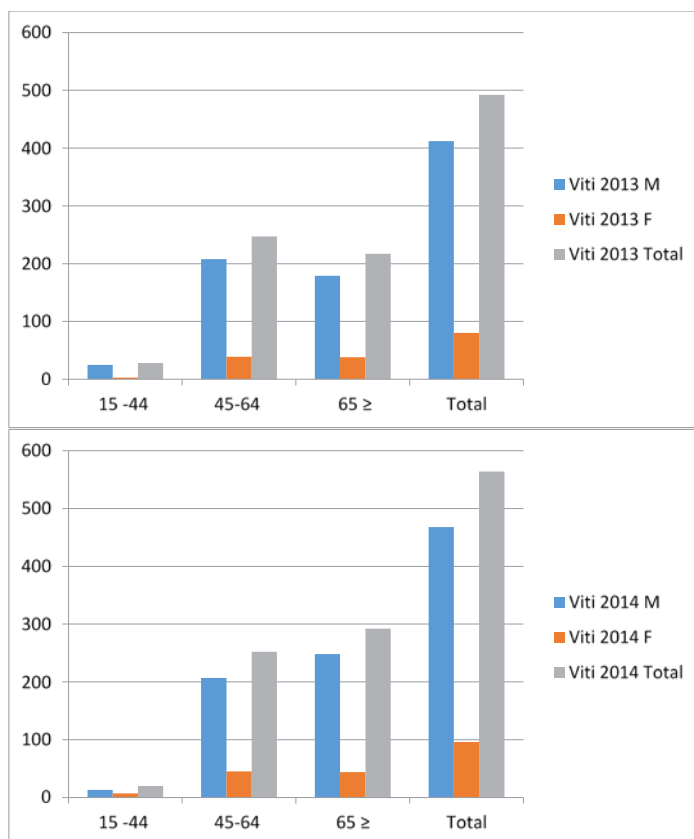
Results

Table No. 5 presents the cases of Pulmonary Cancer hospitalized for the years 2013-2014-2015 by age group and by gender. In this table are three age groups 15-44 years old, 45-64 years old, and over 65 years old.

It is noted that according to age groups, the most affected by Lung Cancer is the age group of 45-64 years respectively: 247 cases (208/39) for 2013, 252 cases (207/45) for 2014, and 142 cases (119 / 23) for the year 2015. Regarding the third age group over 65 years old, it is noticed that in 2014 and 2015 there are more cases than the age group 45-64 years old for the years 2014 and 2015 respectively: 217 cases (179/38) for the year 2013, 292 cases (248/44) for 2014, 252 cases (205/47) for 2015. The tendency is to increase the number of lung cancer diagnosed and treated in hospital from 2013-2014-2015 respectively 492- 564-604 rast.

Table 5

| Diagnosis Code :ICD-9 -162 | Year 2013 | | | | Year 2014 | | | |
|---|-------------------------|------------|-----------|--------------|-------------------------|------------|-----------|--------------|
| Lung cancer hospitalized | Age in years | M | F | Total | Age in years | M | F | Total |
| Age in years | 15 -44 | 25 | 3 | 28 | 15 -44 | 13 | 7 | 20 |
| | 45-64 | 208 | 39 | 247 | 45-64 | 207 | 45 | 252 |
| | 65 ≥ | 179 | 38 | 217 | 65 ≥ | 248 | 44 | 292 |
| | Total | 412 | 80 | 492 | Total | 468 | 96 | 564 |



-
- 36.EPA (February 2013). "Radiation information: radon". EPA.
- 32."A Citizen's Guide to Radon". www.epa.gov. United States Environmental Protection Agency. October 12, 2010. Retrieved January 29, 2012),
- 8.Krewski D, Lubin JH, Zielinski JM, et al. A combined analysis of North American case-control studies of residential radon and lung cancer. *Journal of Toxicology and Environmental Health, Part A* 2006; 69(7):533–597).
- 19.Institute of Statistic of Albania- INSTAT, Statistical Yearbook 2013, 2014, 2015.

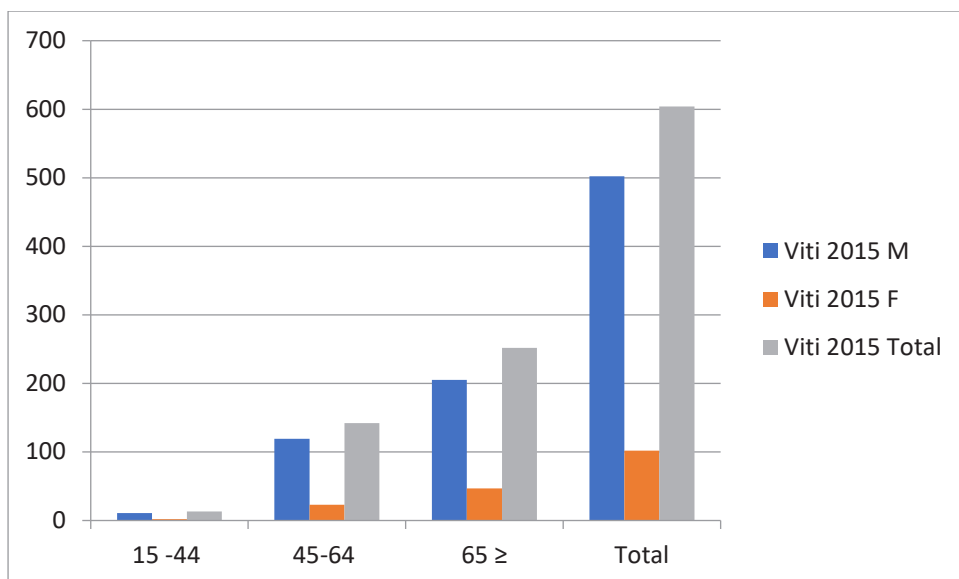


Table No.6 presents the cases of Pulmonary Cancer in the three years 2013-2014-2015, dividing them into urban and male and female peasants. It is noted that the most frequent cases of Pulmonary Cancer in these three years were among men: 492, 564, 604 with a slight increase in 2014, and 2015, and less among the villagers respectively: 311/101, 321/147, 312/190, with a relatively small or constant progressive increase, in 2014 and 2015.

In the case of the male-female ratio, it is noticed that the number of females in relation to the number of males among the three years is smaller respectively 80-96-102 with an increase in 2014 and 2015. The cancer ratio among females in the city and in the village during these three years is respectively 54/26, 64/32 /, 64/38 indicating that there is more lung cancer among women living in the city.

Table No.6

| Diagnosis Code :ICD-9 -162 | 2013 | | | 2014 | | | 2015 | | |
|-------------------------------|------|---|-------|------|---|-------|------|---|-------|
| Lung cancer hospitalized | M | F | Total | M | F | Total | M | F | Total |

| | | | | | | | | | |
|----------------|------------|-----------|------------|------------|-----------|------------|------------|-----------|------------|
| Citizen | 311 | 54 | 365 | 321 | 64 | 385 | 312 | 64 | 376 |
| Peasant | 101 | 26 | 127 | 147 | 32 | 179 | 190 | 38 | 228 |
| Total | 412 | 80 | 492 | 468 | 96 | 564 | 502 | 102 | 604 |

Tables No. 7 and No. 8 present the results of Cancer Patients operated on in thoracic surgery at the University Hospital of Respiratory Diseases. In Table No.7 the surgical treatment of respiratory pathologies in general is greater in number than the Lung Cancer in particular which is being discussed. There are no data for 2013, and for 2014 there are 466 cases of thoracic surgery and of these with pulmonectomy are 185; whereas for 2015, 454 thoracic surgeries were performed and out of these 195 surgeries with pulmonectomy which cannot tell us whether the surgeries were for Pulmonary Cancer or not.

Table No.8 shows the surgical treatment of Pulmonary Cancer in addition to pulmonectomy and lobectomy. The cases operated with Pulmonary Cancer and Lobectomy according to the years are: Pulmonectomy / lobectomy and total for 2013 10 / 26-36 cases; for 2014 the cases with surgical treatment Pulmonectomy / lobectomy and total are: 17 / 44-61 cases; for 2015 the cases with surgical treatment Pulmonectomy / lobectomy and total are: 3 / 41-44 cases. If we analyze carefully, it is noticed that the cases with lobectomy are more preferred for the lung Cancer surgery in relation to the lung and the incision. Cases with pulmonectomy may have been caused by delays in treatment of Lung Cancer.

| | Year | Year | Year |
|--|-------------|-------------|-------------|
| Treatment of Lung Cancer with Surgery | 2013 | 2014 | 2015 |
| Thoracic surgery | ? | 466 | 454 |
| Pulmonectomy surgery | ? | 185 | 195 |

Table Nr.8

| Treatment of Lung Cancer with Surgery | Year 2013 | Year 2014 | Year 2015 |
|---------------------------------------|-----------|-----------|-----------|
| Pulmonectomy | 10 | 17 | 3 |
| Lobectomy | 26 | 44 | 41 |
| Total | 36 | 61 | 44 |

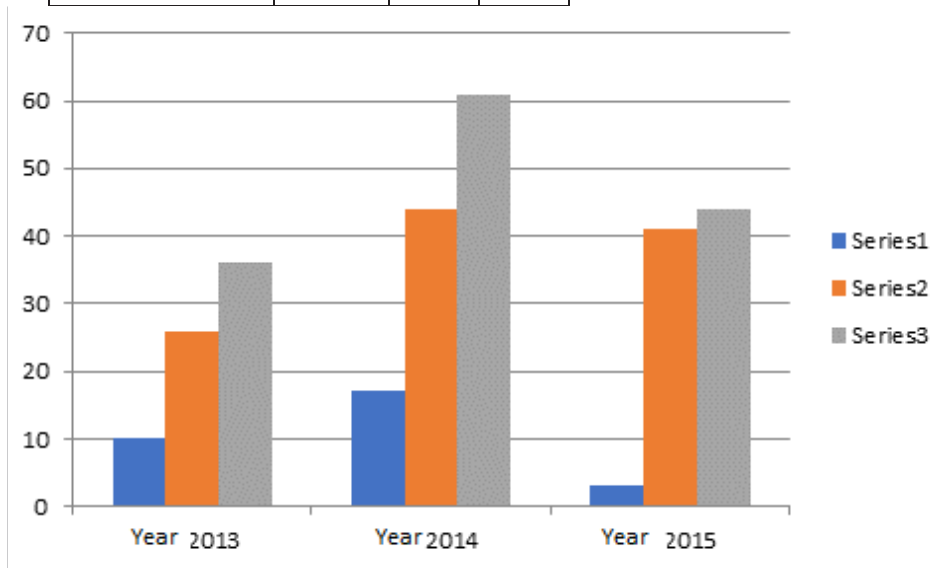


Table Nr.9 shows No. of the inhabitants of the Republic of Albania in the years 2013-2014-2015 as well as two main age groups 15-64 years and over 65 years and the ratio they occupy in relation to the population. These data have been obtained from several sources to determine the exact population in these three years to make calculations based on international data on the risk of Pulmonary Cancer may have in the Albanian population as a cause of Radon gas, and the risk opportunities in smokers and non-smokers from the presence of this gas in the Albanian population. It can be seen from the table that the Albanian population during these three years taken in the study has changed a little for various reasons where the two main reasons are: emigration, low birth rate. Respectively, the population according to the data of INSTAT, CIAFAKT, are for the years 2013-2014-2015: 2.897-2.893-2.889

inhabitants. The ratio of ages 15-64 and over 60 respectively in these three years are: 69% / 108% for 2013; 70% / 11.1% for 2014; and 68% / 10.5% for 2015. This ratio has not changed during these years. These two age groups most affected by Lung Cancer and presented in the previous tables are explained in the following tables.

able nr.9

| Year | Nr. Residential population | Age 15-64 years | % | Age over 65 years | % |
|-------------|----------------------------|-----------------|----|-------------------|------|
| 2013 | 2.897.000 | 2.007.621 | 69 | 312.881 | 10.8 |
| 2014 | 2.893.000 | 2.104.000 | 70 | 333.791 | 11.1 |
| 2015 | 2.889.000 | 1.970.297 | 68 | 302.751 | 10.5 |

<http://www.nationmaster.com/country-info/profiles/Albania/People>;

"Albania People Stats", Nation Master. Retrieved from

<http://www.nationmaster.com/country-info/profiles/Albania/People>;

www.indexmundi.com/albania/demographic;

www.instat.gov.al/media25779/femra_dhe_meshkuj/dem/pdf; Cia world factbook 2015

Vjetari Statistikor 2013, 2014, 2015.

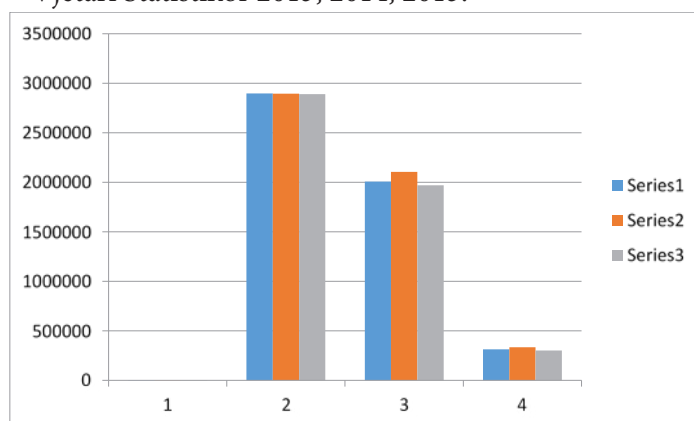


Table No.10 and Table No.11 present comparative data in relation to the population aged 15-64 and over 65 in relation to two international indicators:

- first with the minimum Radon gas per 1000 inhabitants, in residential buildings which can cause Lung Cancer (minimum is 0.4 pCi / L), which in the case of smokers can cause Lung Cancer in 3 inhabitants per 1000

inhabitants and in the case of non-smokers it can cause Lung Cancer to 0.7 inhabitants per 1000 inhabitants (this can be seen in Table No. 4).

- According to these data, it has been established that individuals who are exposed to Radon Cancer can theoretically be affected by Pulmonary Cancer in the minimum possible amount of Radon gas that can cause Pulmonary Cancer per 1000 inhabitants. In the case of smokers the incidence is 3 persons per 1000 inhabitants, and in the case of non-smokers the minimum exposure to Radon gas that can cause Lung Cancer is 0.7 inhabitants per 1000 inhabitants. - The second international indicator is the most accurate standard percentage of smokers in Albania according to these indicators which are presented in Table no. 11.

24.Cia world factbook 2015

19.Institute of Statistic of Albania- INSTAT, Vjetari Statistikor 2013, 2014, 2015.

www.instat.gov.al/media25779/femra_dhe_meshkuj/dem/pdf

18.OBSH, World Health Statistics, 2014; "Albania People Stats", NationMaster. Retrieved from

<http://www.nationmaster.com/country-info/profiles/Albania/People>;

www.indexmundi.com/albania/demografic

Table nr.10

| | | | |
|--|--|--|--|
| Radon + Smokers Likelihood of Lung Cancer: 0.4 pCi / L, 3 people per 1000 | Radon + Smokers Lung Cancer Probability: 0.4 pCi / L, 3 people per 1000 | Radon + Smokers Lung Cancer Probability: 0.4 pCi / L, - 3 people per 1000 | Radon + Smokers Lung Cancer Probability: 0.4 pCi / L, - 3 people per 1000 |
|--|--|--|--|

| 5% - F-over 65 years | 48%-M-over 65 years | 5% - F-15-64 years | 48%-M-15-64 years |
|--|--|---------------------------|--------------------------|
| 23.5 | 225 | 150.5 | 1204.5 |
| 25 | 240 | 157.4 | 1262.4 |
| 22.5 | 217.5 | 192 | 1182 |
| Radon + NO-Smokers Lung Cancer Probability: 0.4 pCi / L, 0.7 persons per 1000 | Radon + NO-Smokers Likelihood of Lung Cancer: 0.4 pCi / L, 0.7 persons per 1000 | No-Smokers | |
| | | 15-64 years | Over 65 years |
| | 15-64 years | | |
| | Over 65 years | | |
| 632 | 98.5 | 903.001 | 140.794 |
| 662 | 105 | 946.011 | 150.203 |
| 620 | 95.3 | 886.633 | 136.237 |

Smoking in Albania is in the following figures: Male 48% and Female is 5%. In this table is also placed the number of the population during the years 2013-2014-2015 which is fully divided by 50% according to the male and female population to find the exact number of female and male smokers. Based on these figures we have found these results in Albania for smokers and their theoretical possibilities to be affected by Lung Cancer in relation to Radon gas pollution of these patients. The results based on these standard data are according to table No.11: for ages 15-64 years the percentage of smoking in Albania based on the number of population according to the years 2013-2014-2015 is respectively for women (it is 5% of the female population but and likely to be at risk of Lung Cancer in the presence of Radon gas): 50,191-51,512-47,812 persons, with a decreasing tendency; while for men for the years 2013-2014-2015 it is respectively (it is 48% of the male population but also likely to be at risk of Lung Cancer in the presence of Radon gas): 401.524-420.801-394.001persons, also with a decreasing tendency.

Regarding male and female smokers for the age group over 65 years, the results are as follows for the years 2013-2014-2015 respectively for Women: 7,811-8,135-7,058 port smokers endangered by Radon gas levels with a slight tendency to decrease; and for Men over 65 for the years 2013-2014-2015 the results are: 75.121-80.002- 72.231 smokers port endangered by Radon gas levels.

Table no. 11

| Year | Total population of Albania | Age 15-64 years in Albania | Age over 65 years in Albania | % of Smoking according to WHO | | | |
|-------------|-----------------------------|----------------------------|------------------------------|-------------------------------|----------------|------------------|-------------|
| | | | | F - 15-64 years | M- 15-64 years | F- over 65 years | M- 65 years |
| | | | | 5% | 48% | 5% | 48% |
| 2013 | 2.897.000 | 2.007.621 | 312.876 | 50.191 | 401.524 | 7.811 | 75.121 |
| 2014 | 2.893.000 | 2.104.000 | 333.786 | 51.512 | 420.801 | 8.315 | 80.002 |
| 2015 | 2.889.000 | 1.970.297 | 302.749 | 47.812 | 394.001 | 7.058 | 72.231 |

Also, in table no. 11, according to WHO data, (World Health Statistics 2014)

(Smoking: 40% Male and 5% Female)

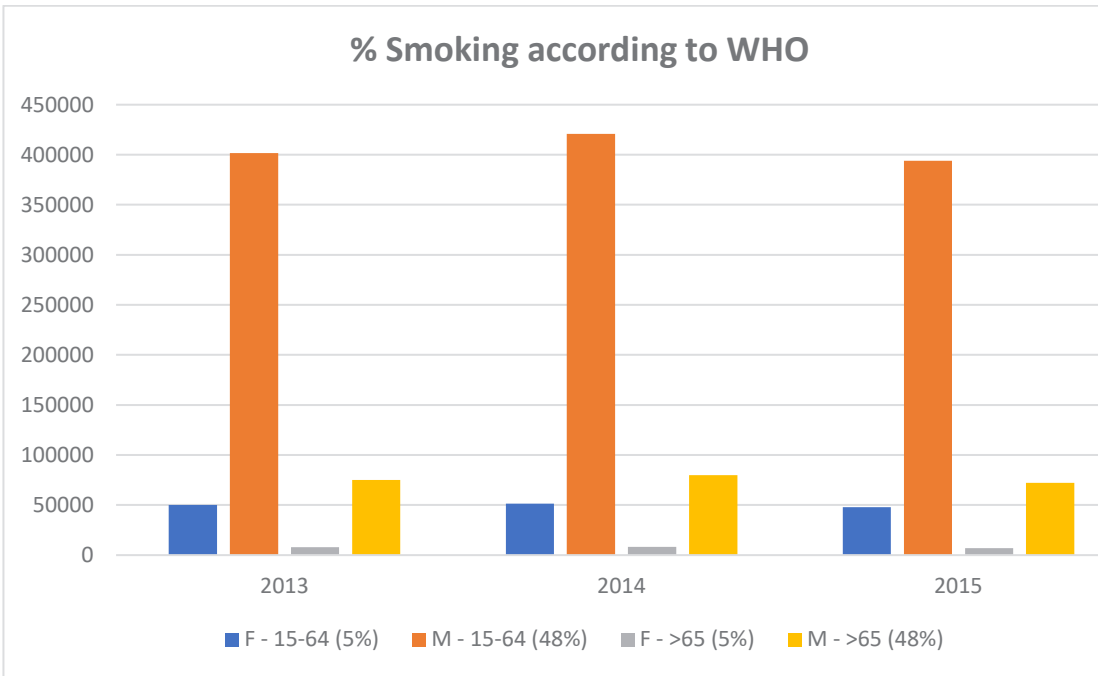
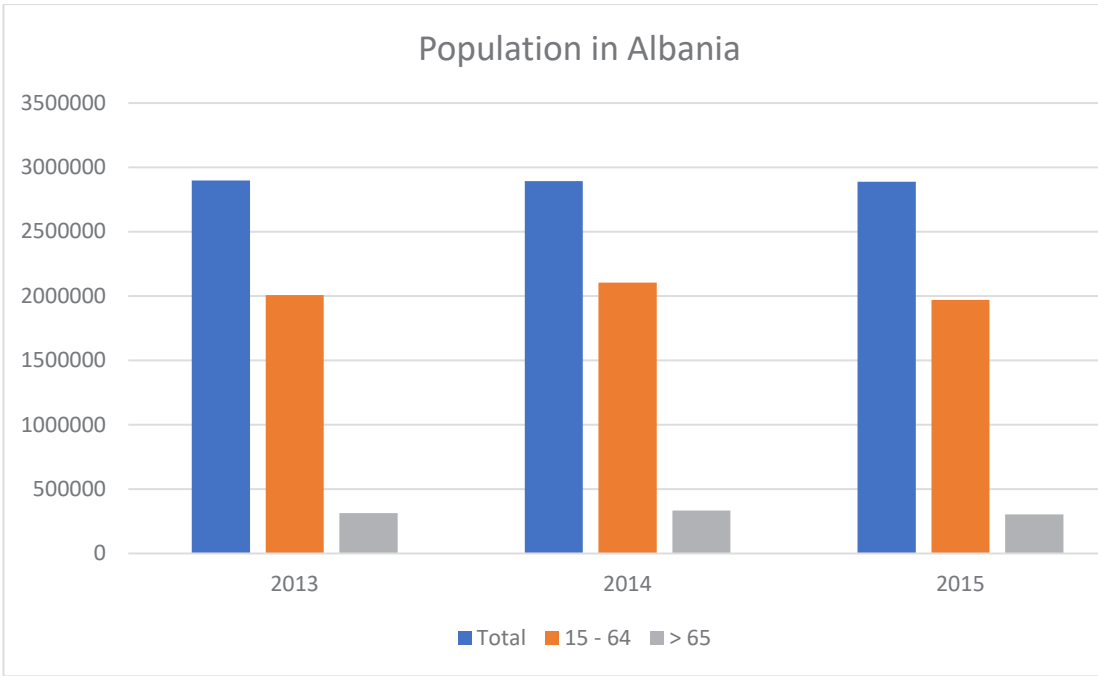


Table No.12 presents the theoretical total potential for the number of individuals who may be affected by Pulmonary Cancer in Albania compared to the patients actually affected in these three years taken in the study.

It is observed that there is a difference between real Pulmonary Cancer during the three years taken in the study and caused by smoking under the influence of Radon gas in smokers and non-smokers with those presented theoretically based on the potential risk of Radon Gas in the population Albanian (for whom we have no real data in patient records nor data from controls with Radon gas meters in apartments during these years).

Statistical data are taken from standard data obtained from the literature and international health organizations in the world such as WHO, Ciafact, etc., and from data obtained from INSTAT, IPH, and the University Hospital of Pulmonary Diseases 'Shefqet Ndroqi', Tirana (Sanatorium), for Pumonar Cancer and their comparison to really see what can happen or what has happened and what is the future of Pulmonary Cancer in Albania. According to the presented data, it is noticed that during the years 2013-2014-2015, 492-564-604 persons were ascertained and hospitalized in the University Hospital of Lung Diseases, respectively.

Regarding the ages 15-64 and over 65 together, in Albania, the theoretical possibility (total theoretical) of lung cancer for non-smokers given the minimum standard of exposure which is 0.7 persons / 1,000 male inhabitants and female together 15-64 years old and over 64 years old is for the years 2013-2014-2015 respectively: 730.5 (632 +98.5) -716 (662 + 105) -715.5

(605 + 95.3) persons. The trend remains a small decline. If you look at the real patients who have been hospitalized with Lung Cancer, it can be seen that the number of people who could theoretically be affected with the real ones has a not insignificant difference.

18.OBSH, World Health Statistics, 2014

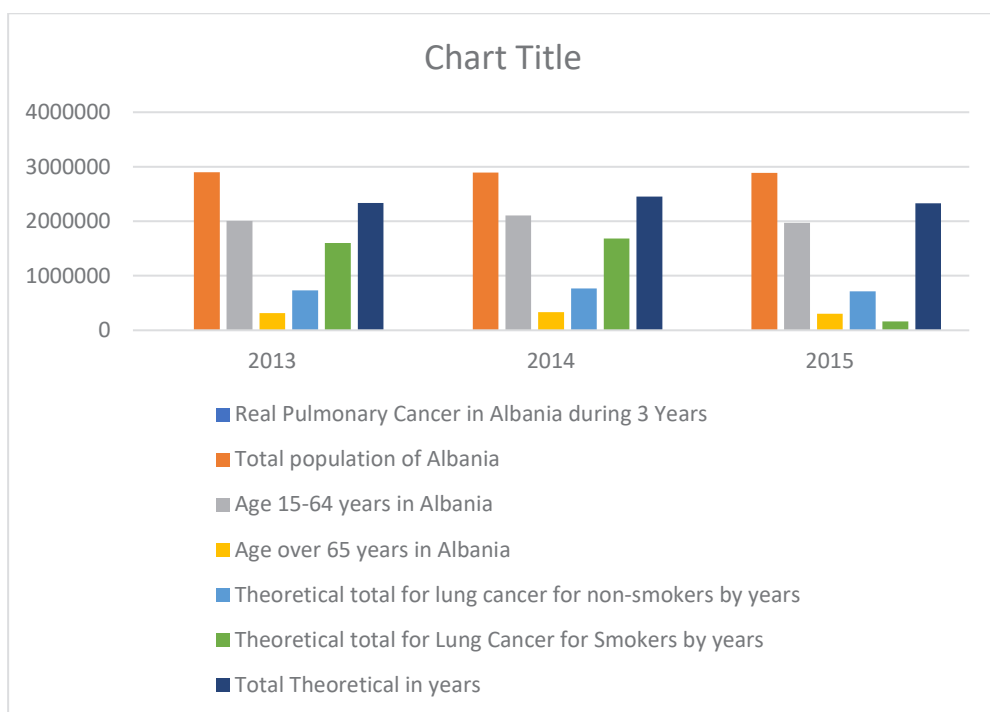
We can see in this table that the number of patients who may be affected by Pulmonary Cancer during the three years taken in the study given the standard of Pulmonary Cancer exposure caused by the levels (lowest possible that could cause Cancer Pulmonary) of Radon gas which is 3 persons / 1000, are respectively for smoking women (5% smoking in the Albanian female population) 15-64 years old: 23.5-25-22.5; and for those over 65 years of age are: 150.5-157.5-192. So it is noticed that Pulmonary Cancer in the presence of Radon gas in Smokers is higher at the age of 65 and with an increasing tendency. In the male smoking population during the years 2013-2014-2015 (48% of the male population is smokers) the following data appear for the population aged 15-64: 1204.5-1262.4-1182 persons; while for those over 65 years old: 225-240-217.5 persons. There is a big difference between the possibility of causing Theoretical Cancer by Radon Gas in non-smokers and smokers in these three years in relation to the real Lung Cancer hospitalized in the University Lung Hospital (Sanatorium) respectively for the years 2013-2014-2015 : 492-564-604 real people hospitalized with Lung Cancer compared to 2333.5-2451.8-2329 people who could get Lung Cancer theoretically based on international standards of Lung Cancer caused by Radon gas.

Table no. 12

| Year | Real Pulmonary Cancer in Albania during 3 Years | Total population of Albania | Age 15-64 years in Albania | Age over 65 years in Albania | Theoretical total f cancer for non-smc years from Radon gas (0.7 / 1000 inhabita |
|-------------|--|------------------------------------|-----------------------------------|-------------------------------------|---|
| 2013 | 492 | 2.897.000 | 2.007.621 | 312.876 | 730.5 |
| 2014 | 564 | 2.893.000 | 2.104.000 | 333.786 | 767 |
| 2015 | 604 | 2.889.000 | 1.970.297 | 302.749 | 715.3 |

| 15-64 years | over 65 years |
|-----------------------|----------------------|
| 632 (F31.5/M600.5) | 98.5 (18.5/80) |
| 662 (F34/M628) | 105 (F20.1/M80.4) |
| 620 (F31/M589) | 95.3 (F17/M78.3) |

| 5% - F- over 65 years | 48%-M- over 65 years | 5% - F-15- 64 years | 48%-M- 15-64 years |
|-----------------------------------|----------------------------|------------------------------|--------------------------|
| 23.5 | 225 | 150.5 | 1204.5 |
| 25 | 240 | 157.4 | 1262.4 |
| 22.5 | 217.5 | 192 | 1182 |

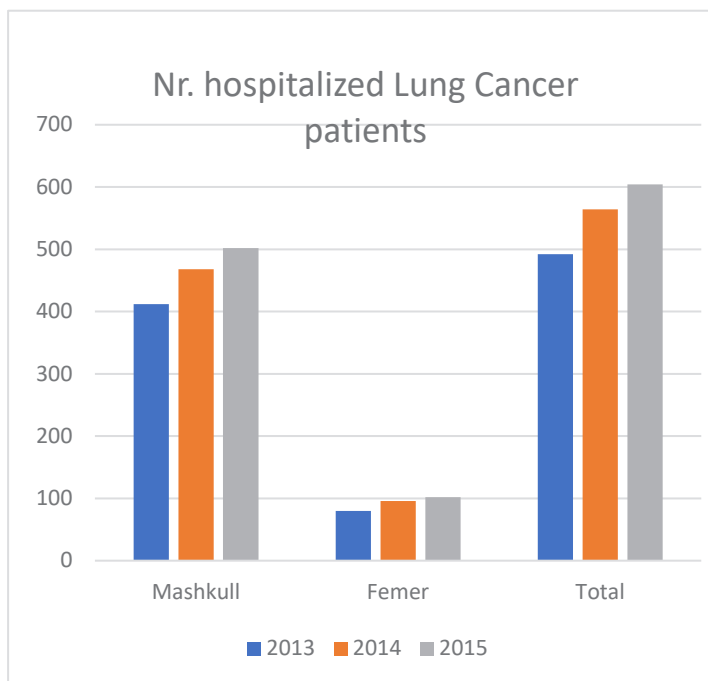


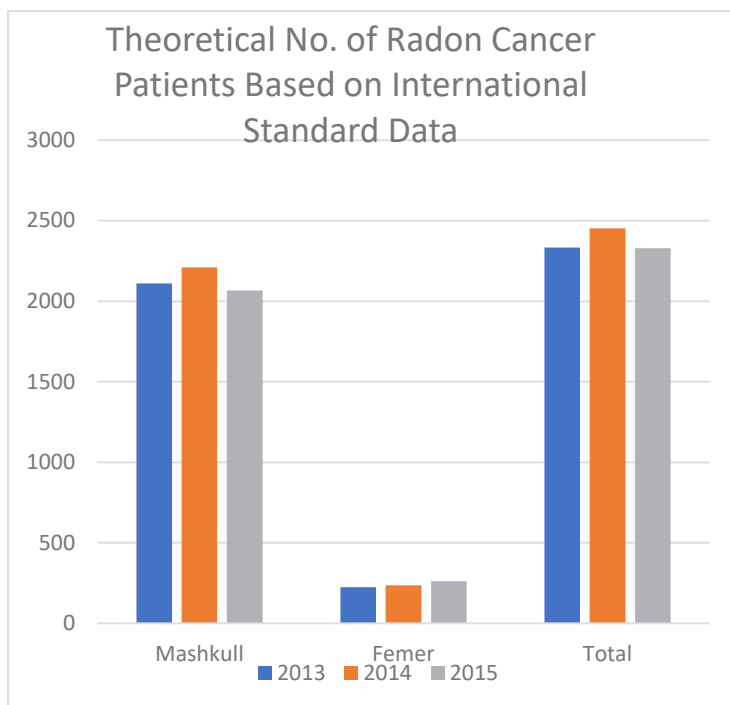
In Table no. 13, compared to the male / female ratio actually affected and hospitalized which are presented in table No.6 we can see that for the years 2013-2014-2015 which is in both age groups together: 412/80 (492) -2013, 468/96 (564) -2014, 502/102 (604) -2015, there is an increasing tendency of Pulmonary cancer actually during these three years. While the total theoretical impact from Lung Cancer on male smokers and non-smokers based on international standards can be

according to table No. 12 in both age groups together is respectively:
 2110 / 224.5 (2333.5) -2013,
 236 / 2210.8 (2451.8) -2014, and 262.5 / 2066.8 (2329.3) -2015.

Table No.13

| Years taken into study | Nr. hospitalized Lung Cancer patients | | | Theoretical No. of Radon Cancer Patients Based on International Standard Data | | |
|------------------------|---------------------------------------|-----|-------|---|-------|--------|
| | M | F | Total | M | F | Total |
| 2013 | 412 | 80 | 492 | 2110 | 224.5 | 2333.5 |
| 2014 | 468 | 96 | 564 | 2211 | 236 | 2451.8 |
| 2015 | 502 | 102 | 604 | 2067 | 262.5 | 2329.3 |





Discussions and Statistical Analysis

In this study, the differences between patients actually affected by Pulmonary Cancer during these three years with the theoretical possibilities of exposure to Radon Cancer caused by Radon gas in smokers and non-smokers is large ($p < 0.001$). This may be related to low Radon gas levels in village homes, lack of Radon gas measurements with relevant equipment, quality level of Pulmonary Cancer diagnosis, and health education of the population for this nosology.

These data also show that the knowledge of this dangerous cause like Radon gas in causing Pulmonary Cancer which ranks first among other Malignant Cancers like Prostate Cancer and Breast Cancer presented in **table no. 3**, it is necessary, and appropriate policies should be promoted to prevent damage from this dangerous gas causing Lung Cancer.

It is observed that Pulmonary Cancer mostly affects young and middle-aged 15-44, 45-64 years with a slight upward trend ($p < 0.1$) in the three years taken in the study, while ages over 65 years in a number of patients with Lung cancer has a slight growth trend ($p < 0.1$) over the years but is constant (**Tab.5**).

Regarding the rural and urban population, when it comes to living in the village or in the city, it is noticed that in the urban population there are more cases of Pulmonary Cancer than in the village. The tendency for Cancer is increasing for both rural and urban areas during the three years studied, but the increase is not significant ($p < 0.1$). By gender Pulmonary cancer affects more men than women both in urban and rural areas and here the difference is significant ($p < 0.001$) (**Tab No.6**). The operations performed at the University Hospital of Pulmonary Diseases in Tirana show an increase in Surgical operations to remove Cancer from the Pulmonary and the increase is significant in total for the operations: Pulmonectomy and Lobectomy together ($p < 0.001$), while for pulmonary ectomy operations not kadife major mdeje in 2016 has fewer pulmonectomy for Lung Cancer than lobectomy. This indicates that people with Lung Cancer are diagnosed earlier and therapy tends to be easier to do lobectomy than pulmonectomy, accompanied by other therapeutic procedures (**Tabs No. 7 and No. 8**).

In this study, Pulmonary Cancer caused by the main causes Radon and smoking, is taken in relation to the exact population of the Republic of Albania and the population of the Republic of Albania according to the Census and International data in these three years there is no significant increase in causes and the reasons explained above; emigration and birth rate reduction (**Tab No. 9**).

Given the standard data of table no. 4 on the possibility of causing Pulmonary Cancer per 1,000 persons in smokers and non-smokers respectively 3 persons / 1,000 inhabitants, comparing them with the smoking population in males and females which according to WHO 2014 data for Albania were 48 % of men and 5% of women (WHO, World Health Statistics, 2014), also compared with the age group 15-64 years and the age group over 66 years during the three years taken in the study, found that the theoretical number of smoking patients in the presence of Radon gas that could be affected by Lung Cancer for men is respectively for three years (2013-2014-2015), for age group over 65 years: 225-240-217.5me with a $p < 0.1$ non-significant. For Women it is respectively for three years (2013-2014-2015), for the age group 15-64 and over 65: 23.5-25-22.5 with a $p < 0.1$ not significant.

For the age group 15-64 years in relation to the age group over 65 years for men the theoretical number of potentially affected by Lung Cancer theoretically caused in the presence of Radon gas, is for men the highest for the three years respectively: 1204.5 - 1262.4 - 1182 with a $p < 0.01$ ie significant; whereas for women the theoretical number of those affected in the three years is respectively: 150.5 - 157.4 - 192, ie a significant difference $p < 0.001$.

In the case of non-smokers in whom the risk of lung cancer is 0.7 per 1,000 inhabitants, compared with the smoking population in men and women which according to WHO data for 2014 in Albania were 48 % of men and 5% of women, also compared to the age group 15-64 years and the age group over 66 years during the three years taken in the study, were found that the theoretical number of Non-smoking patients in the presence of Radon gas that can to be affected by Lung Cancer in total males and females is respectively for three years (2013-2014-2015), for age group over 65 years: 98.5-105-95.3 where the difference is not significant in age group $p < 0.1$, and for age group 15-64 years respectively for all three years in total male female respectively is: 630-662-620. The difference is not significant $p < 0.1$. But the difference between the two age groups is significant between the two age groups in favor of the age group 15-64 years $p < 0.001$ (**Tab No.10**).

In **Tab Nr.11** we can find the number of smoking population of the Republic of Albania according to the percentages of WHO (WHO, World Health Statistics, 2014) which in the three years taken in the study has no increase among males ($p < 0.1$), and among females ($p < 0.1$), but the difference is certainly significant in the male-female ratio ($p < 0.001$). According to **Tab No.12**, a comparative assessment was made between the real cases hospitalized with Pulmonary Cancer in the Republic of Albania in the three years taken in the study which were presented with 492 cases for 2013, 562 cases for 2014 and 604 cases for 2015. in relation to the population in these three years, respectively, and the theoretical possibility of being affected by Lung Cancer in the presence of Radon gas, for non-smokers (0.7 / 1000 inhabitants) and smokers 3/1000 inhabitants.

The total differences for smokers likely to be affected by Lung Cancer in the presence of Radon gas are respectively by years: 1603.5-1684.8-1614 persons with a $p < 0.001$, ie a significant difference.

29.Toxicological Profile for Radon, Table 4-2 (Keith S, Doyle JR, Harper C, et al. Toxicological Profile for Radon. Atlanta (GA): Agency for Toxic Substances and Disease Registry (US); 2012 May. 4, CHEMICAL, PHYSICAL, AND RADIOLOGICAL INFORMATION.) Retrieved 2015-06-06).

30Toxicological profile for radon, Agency for Toxic Substances and Disease Registry, U.S. Public Health Service, in collaboration with U.S. Environmental Protection Agency, December 1990)

31.Radon Toxicity: Who is at Risk?, Agency for Toxic Substances and Disease Registry, 2000)

33."Known and Probable Carcinogens". American Cancer Society. Retrieved 2008-06-26

The total differences for non-smokers likely to be affected by Lung Cancer in the presence of Radon gas are respectively by years: 730.5-767-715.3 persons with a $p < 0.001$, ie a significant difference in relation to Pulmonary Cancer that actually has occurred in Albania.

The differences are not significant, ie with $p < 0.1$ in relation to the cases that actually occurred and were hospitalized in the University Pulmonary Hospital, in cases when it comes to theoretical (possible) Lung Cancer for non-smokers for the age group 15-64 years (males and females in total) respectively by years: 632-662-620, and for those over 65 years of age (males and females in total) respectively: 98.5-105-95.3.

Also presented in tab No. 13 are summarized the results presented above in which the significant differences ($p < 0.001$) between the actual Cancer hospitalized and operated in the Hospital with possible Lung Cancer caused by Radon gas over the years for year 2013 - actually 492 with 2333.5; for 2014- actually 468 with 2451.8; for 2015 actually 604 with 2329.3 persons.

While real Pulmonary Cancer in the three years taken in the study compared with possible Cancer in the presence of Radon gas in women has a non-significant difference $p < 0.1$ (224.5-236-262.5 persons).

Here may be influenced by several factors such as:

-statistical data missing over the years which is the most vulnerable medicine,

- Lack of accurate and periodic measurements of Radon gas levels in dwellings in the Albanian territory,

-Inaccurate and delayed diagnosis of Lung Cancer in regional, private, possibly tertiary university hospitals,

- Delayed presentation of patients to be diagnosed

- duration of the impact of Radon gas on persons exposed to it in their homes,

-presence of persons living in ground floor dwellings, basements, near mines, etc.

However, the big differences in relation to the real impacts from Pulmonary Cancer with those that could occur based on the standards presented above according to the WHO, and other health organizations through projects for the prevention and treatment of Pulmonary Cancer, show that in this cancer nosology greater efforts to clarify real Radon gas levels in Albanian homes as well as investments in preventative measures. It can be said that significant differences ($p < 0.001$) in the results obtained in the study, relate to the problems presented above as the qualitative level of diagnosis of Pulmonary Cancer, with the health education of the population for this nosology, the lack of measurements of Radon Gas levels with relevant equipment in urban and rural areas, etc.

The advantages of the Study lie in the advantage that it shows the possibility of theoretical exposure to Lung Cancer and the preventive measures that can be taken. The study was conducted to present the danger of Radon gas in causing Lung Cancer in the smoking and non-smoking population.

The limitations of this study lie in the impossibility to perform direct measurements with Radon gas measuring devices in a systematic way in the inhabited areas in cities and villages of Albania, but presents the theoretical possibility of Pulmonary Cancer in its presence based on international standard figures. .

Conclusions.

- Lung Cancer caused by Radon Gas in both Smokers and Non-smokers is a more common phenomenon than known in Albania in terms of the causes of Lung Cancer,

- The tendency of Pulmonary Cancer in Albania due to the presence in the dwellings and places of residence of the population is in a slight increase not significant, but that must be confirmed with Radon measuring devices (digital radon detector).
- In addition to Smoking, many factors influence the development of Radon-associated Lung Cancer from Radon:
 - Age during exposure
 - prolongation of exposure
 - Radon concentration as a function of age and duration of exposure
 - Time spent at home (bedtime, work time, and home and office recreation) and Radon concentrations at home, in the office, on transport routes
 - water sources, if it is well water has a large amount of Radon, the upper floors can be influenced much more than the lower ones (eg, from rain showers)
 - Climate and Weather during the year in cold weather Radon levels are often higher than in winter and lower in summer.
 - Static time of year - are the times when Radon derivatives stick to dust particles and can be added during these months and the time elapsed after the start of exposure. (Biological Effects of Ionizing Radiation VI report, Health Effects of Exposure to Radon (NAS 1999, and (NRC 1999; EPA 2003).

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- 7148 persons with lung cancer and 14,208 persons without lung cancer from 13 epidemiologic studies in Europe. *Scandinavian Journal of Work, Environment and Health* 2006; 32(Suppl 1):1–83. Erratum in *Scandinavian Journal of Work, Environment and Health* 2007; 33(1):80. [PubMed Abstract]
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26. ISHP&Instituti I studimeve Berthamore, 'Results Of The National Survey On Radon indoors in Albania' referring in AIP (Conf. Proc. 1203, 672 (2010); <http://dx.doi.org/10.1063/1.3322533>, Kozeta Bode^a, Elida Bylyku^a, Florinda Cfaraku^a, Irena Mucollari^b and Manjola Shyti^b

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28. Zdrojewicz, Zygmunt; Strzelczyk, Jadęga (Jodi) (2006). "Radon Treatment Controversy, Dose Response". *Dose-Response*. **4** (2): 106–18. doi:10.2203/dose-response.05-025.Zdrojeicz. PMC 2477672. PMID 18648641.
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31. Radon Toxicity: Who is at Risk?, Agency for Toxic Substances and Disease Registry, 2000)
32. "A Citizen's Guide to Radon". www.epa.gov. United States Environmental Protection Agency. October 12, 2010. Retrieved January 29, 2012.
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34. "A Citizen's Guide to Radon". www.epa.gov. United States Environmental Protection Agency. October 12, 2010. Retrieved January 29, 2012.
35. NRÇ 1999; Darby 2005; Krewski et al 2005.
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** Comparison data calculated using the Centers for Disease Control and Prevention's 1999-2001 National Center for injury Prevention and Control Reports.
38. * Lifetime risk of lung cancer deaths from EPA Assessment of Risks from Radon in Homes (EPA 402-R-03-003).

*** Comparison data calculated using the Centers for Disease Control and Prevention's 1999-2001 National Center for injury Prevention and Control Reports).*<https://www.epa.gov/radon/health-risk-radon>

39. *World Health Statistics 2014*

Bioethical Consideration of the Status of Animals

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Summary

In this paper, the author explores the reception of the non-human living beings in modern philosophical and practical approaches. The analysis is aimed at examining both the views of the representatives of classical anthropocentrism, as well as the theses of the representatives of various non-anthropocentric teachings. Anthropocentrism is, in short, a worldview that is based on Aristotle's vision of man as a special being among other natural beings. Advocates of the questioning of the dominant anthropocentric perspective of the *cosmos*, on the other hand, are trying to establish the new relation by relativizing of the difference between humans and non-human living beings, by attributing specifically human qualities and categories, such as dignity, moral status and rights, as well as feelings, memories, communication, consciousness and thinking to non-human living beings. Non-anthropocentrists, consequently, believe that it is necessary to relax the usual strict hierarchy among beings in nature, that is, the discrediting of animals in relation to man, and that within the applied ethics, *alias* bioethics, it is possible, even necessary, to establish the so called "animal ethics".

Key words: bioethics, consideration, status, animals, moral approach, proper treatment

The dignity¹ of an individual is usually viewed from the perspective of the reasonableness of one's nature, and such nature is attributed primarily to man. Only he is considered to be liberated from the empire of goals, while the so-called non-human living beings associated to relations and relationships that exist in nature. Only men are aware of themselves and able to distance themselves from themselves in favour of higher goals, to relativize their own interests, up to self-surrender.² This gives him, as a moral being, an absolute status that justifies his characteristic dignity, which entitles him not to be "enslaved" by anyone and that as a moral person he is not deprived of his own goals.

His unique dignity also generates his unique rights. In that sense, Article 1 of the "Universal Declaration of Human Rights" from 1948 states: "*All human beings are born free and equal in dignity and rights*".³ And in Article 23 of the „Устав Републике Србије“ ("Constitution of the Republic of Serbia") the constitution-maker states: "*Human dignity is inviolable and everyone is obliged to respect and protect it*".⁴ This is not only an ontological statement, but at the same time a source of the law and therefore Article 3 of the Constitution stipulates: "*Rule of law is a fundamental prerequisite for the Constitution which is based on inalienable human rights*".⁵ The highest ranking legal act of Serbia seems to be written on the postulates of Kant's ethics, which strived to reach the highest ethics,⁶ while it developed the dignity of living beings and the rights stemming from it only for people, and thus indirectly contributed to the fact that until recently the "dignity" of animals⁷ and

¹ Human dignity has often been linked to Immanuel Kant's second formulation of the categorical imperative: "Act so that you use humanity, as much in your own person as in the person of every other, always at the same time as end and never merely as means". Consult: Kant, I. (2002). *Groundwork for the Metaphysics of Morals*. New Haven and London: Yale University Press, 46-47. Trans. A. W. Wood. See also: Eterović, I. (2017). *Kant i bioetika*. Zagreb: PERGAMENA, Cent. za int. bioet. Fil. fak. Sveuč. u Zagrebu, 104-110.

² Consult: Derrida, J. (2002). The Animal That Therefore I Am (More to Follow). *Critical Inquiry* 28, 2: 369-418. Internet address: <http://www.jstor.org/stable/1344276>.

³ "The Universal Declaration of Human Rights". Internet address: <http://www.un.org/en/universal-declaration-human-rights/>.

⁴ „Устав Републике Србије“. (2006). Београд: Канц. за сарад. с мед. Владе Републике Србије, 9. Trans. Ž. Kaluđerović.

⁵ „Устав Републике Србије“. (2006). Београд: Канц. за сарад. с мед. Владе Републике Србије, 4. Trans. Ž. Kaluđerović.

⁶ On ethics as thinking on practical thinking, i.e. as a philosophical discipline on morality see author's paper: Kaluđerović, Ž. (2016). Pretpostavke nastanka morala. *Bošnjačka pismohrana* (Zbornik radova Simpozija "Gdje je nestao - moral"). 15, 42-43: 135-147.

⁷ The definition of "animal" can not be easily or unambiguously determined. According to "European Convention for the Protection of Vertebrate Animals used for Experimental and Other Scientific Purposes", "animal" means any live non-human vertebrate, including free-living and/or reproducing larval forms, but excluding other foetal or embryonic forms. In the Preamble of this convention it is stated that animals have capacity not only for suffering but also for memory, so therefore man has a moral obligation to respect all animals. "European Convention for the Protection of Vertebrate Animals used for Experimental and Other Scientific Purposes". Internet address: <http://conventions.coe.int/treaty/en/treaties/html/123.htm>. In Article 5, point 13 of the „Закон о добробити животиња Републике Србије“ (Law on Animal Welfare of the Republic of Serbia), "animal", for example, is

“rights” of animals were never mentioned.

The anthropocentricity⁸ of this and such *Weltanschauung* is an important reason why our dominant technical civilization did not develop in harmony with nature, but much more often in opposition to it. No human act in the past was able to substantially affect the spontaneity of the existence of our planet. As much as man was changing the natural environment in which he lived, this did not leave a greater trace on Earth itself.

The rapid development of technics and technology in this as well as in the last century placed man into a new moral situation. The new situation is reflected in the fact that modern man needs to accept the responsibility⁹ for the effects which are not the result of action of any individual, but represent a collective act, an act, in Husserlian terms, “of anonymous functioning subjectivity”.¹⁰ The effects of modern technique suggest a completely new situation for traditional social and humanistic sciences, since the postulate of an anthropocentric image of the world is essentially derogated in the sense that people as species are unquestionable in their existence on the Earth. Ensuring the survival of the human species in the foreseeable future is a task to whose achievement new knowledge in some of them should contribute, especially in ethics¹¹ or bioethics.¹² In order for this fact to be confirmed, they need to re-examine the power of technique, whose deeds thus acquire a philosophical sign, given the importance they have in the lives of the human species.¹³

defined reductively but unambiguously as any vertebrate which has a capacity to feel pain, suffering, fear and stress. „Закон о добробити животиња Републике Србије”. Internet address: http://www.paragraf.rs/propisi/zakon_o_dobrobiti_zivotinja.html.

⁸ Aristotle's paragraph from the *Politics* (1256b15-22) is emphasized as a paradigm of the leading western tradition and its unquestionable anthropocentrism. Consult: Singer, P. (1998). *Oslobođenje životinja*. Zagreb: Ibis grafika, 158; See also: Калуђеровић, Ж., Миљевић, А. (2019). Стагиранин, Ерешанин и не-људска жива бића. *ARHE*. XVI, 31: 105-131. Internet address: <http://arhe.ff.uns.ac.rs/index.php/arhe>.

⁹ For more details on the concept of responsibility consult: Čović, A. (2009). Biotička zajednica kao temelj odgovornosti za ne-ljudska živa bića. In A. Čović, N. Gosić, L. Tomašević. (eds.). *Od nove medicinske etike do integrativne bioetike*. Zagreb: PERGAMENA / Hrvatsko bioetičko društvo, 33-46.

¹⁰ See: Husserl, E. (1970). *The Crisis of European Sciences and Transcendental Phenomenology*. Evanston: Northwestern University Press, 111-114.

¹¹ It would be possible therefore, on the trail of Hans Jonas, to establish a new imperative: “We should not compromise the conditions for an indefinite continuation of humanity on earth”. Jonas, H. (1990). *Princip odgovornosti*. Sarajevo: Veselin Masleša, 28. Consult also: Jurić, H. (2010). *Etika odgovornosti Hansa Jonasa*. Zagreb: PERGAMENA, 153-165.

¹² Fritz Jahr coined the original term Bioethics and formulated a Bioethics Imperative: ‘Respect every living being on principle as an end in itself and treat it, if possible, as such!’. Jahr, F. (2012). Reviewing the ethical relations of humans towards animals and plants. In A. Muzur, H.-M. Sass. (eds.). *Fritz Jahr and the Foundations of Global Bioethics. The Future of Integrative Bioethics*. Berlin – Münster – Wien – Zürich – London: Lit Verlag, 4. See: Zagorac, I. (2018). *Bioetički senzibilitet*. Zagreb: PERGAMENA, Znan. cent. izv. za int. Bioetiku, 155-167.

¹³ In the meantime, nature has begun to vigorously “protest” against excessive human activity by changing the climate on Earth (“global warming”), but also by increasing the number of diseases

The dominant anthropocentric image of the world,¹⁴ and the ensuing consequentialist relation of man to nature and animals, has been questioned over the last decades by non-anthropocentric expansion of ethics, and by ever louder posing of (bio)ethical demands for a fundamental and new settlement of relations between humans and animals. If one attempts to summarize the basic views of the leading authors Peter Singer,¹⁵ Tom Regan¹⁶ and Klaus Michael Meyer-Abich,¹⁷ which are representative of present discussions of the new regulation of human-animal relationships, then the main views are as follows:

1. Animals are beings that are capable of suffering¹⁸, with their own interests and needs that are similar to the basic needs of people.
2. If there is such similarity, the principle of equality requires that the interests of animals are respected as well as the similar interests of humans.
3. Animals have their own value, which for some (Singer and Regan) stems from their consciousness, while others (Meyer-Abich) attribute additional importance to the affinity of animals and humans.

Singer talks about animals - "personalities", and Regan about "subjects of life". Both of them derive from that the "rights" of animals¹⁹ on the basis of their type of treatment and protection of their lives, which is why it is forbidden to kill them for the purpose of eating.²⁰ Meyer-Abich speaks of the "dignity" of animals, and

and plagues in humans and animals. Burning stakes during the crisis of so-called "Mad Cow", "Bird Flu", "Swine Flu" diseases, or the latest "African Swine Fever", to name some, are just a warning to people and a hint of much more serious problems they may face. As an imperative, a new order in life is introduced, where one will become aware that the Earth can no longer tolerate man's often ruthless acts, but requires the cooperation of man with the world surrounding him. Parts of comments have been taken and paraphrased from: Kaluderović, Ž. (2018). Bioethics and Hereditary Genetic Modifications. *Conatus - Journal of Philosophy* 3, 1: 31-44. Internet address: <https://ejournals.epublishing.ekt.gr/index.php/Conatus/article/view/18452>.

¹⁴ About the roots of anthropocentrism consult: Krznar, T. (2016). *U blizini straha*. Karlovac: Veleučilište u Karlovcu, 63-76.

¹⁵ Singer, P. (2011). *Practical Ethics*. New York: Cambridge University Press; Singer, P. (2001). *Writings on an Ethical Life*. New York: HarperCollins Publishers Inc.

¹⁶ Regan, T. (2004). *The Case for Animal Rights*. Berkeley: University of California Press; Regan, T. (1982). *All That Dwell Therein*. Berkeley: University of California Press.

¹⁷ Meyer-Abich, K. M. (1997). *Praktische Naturphilosophie*. München: C. H. Beck; Meyer-Abich, K. M. (1984). *Wege zum Frieden mit der Natur*. München und Wien: Hanser.

¹⁸ At the end of the well-known passage about the non-human part of animal creatures, which, as is often stated, is a departure from the mainstream of Western philosophy, Jeremy Bentham says: "The question is not Can they reason?", or Can they talk?" but Can they suffer?". See: Bentham, J. *An Introduction to The Principles of Morals and Legislation*, 144. Internet address: <http://www.earlymoderntexts.com/assets/pdfs/bentham1780.pdf>.

¹⁹ Consult: Sirilnik, B., Fontene, E de., Singer, P. (2018). *I životinje imaju prava*. Novi Sad: Akademaska knjiga, 15-97.

²⁰ Joseph R. Des Jardins states critical views on Singer's and Regan's views. Žarden, Dž. R. de. (2006). *Ekološka etika*. Beograd: Službeni glasnik, 193-200. See also: McMahan, J. (2002). *The Ethics of Killing*. Oxford: Oxford University Press, 194-203.

from that derives the “rights” of animals, which prohibit the keeping of animals in massive farming,²¹ but not the killing of animals after a life that was suitable for an animal, for the purpose of feeding people. It is noted that these basic thoughts are partially overlapping, but also that the results diverge at the central point of killing of animals.

Is it enough if Meyer-Abich, in order to explain his opinion, indicates that the condition of our existence to live from the rest of our lives, and that, in the end, vegetarians also eat life by eating plant foods?²² Is it advisable when Regan, in order to explain his contrary opinion, indicates that all mammals have an “inherent value”²³ that makes them “subjects of life” because of their consciousness, thereby providing them with “rights” in which man should not interfere, with the exception of severe cases of conflict like the necessary defence?

In order to ensure that the demands for higher or lower own “rights” of animals, would not remain only calls without any prospect of success, it should be clarified to what extent they are compatible with the usual thinking about (bio)ethics, and to what extent they can be realized in practical and political frameworks. In other words, what is lost and whether anything is lost, if the “dignity” of animals and the corresponding animal “rights” are also recognized in addition to human dignity and human rights.

From the philosophical aspect, at the first glance understandably tense situation greatly diminishes, since most western philosophers have believed and/or believes that, as already mentioned, only human beings have moral dignity, given that the required legal equality of men and animals does not mean that life is equal to life in any case. Regan explains this with his famous example of a packed lifeboat in which there are several people and one big dog.²⁴ It is assumed that the boat could be kept afloat only if one of the passengers would be thrown from the deck into the river or the sea. To the regret of all animal lovers and to the joy of all anthropocentrists, Regan “throws” the dog from the deck - surely with a heavy heart, but with the justification that the damage that death brings with it for one individual consists in the loss of its opportunities for life, and that these are greater for a man than for a dog. If a collision occurs, the value of the lives of different individuals must be measured, and individuals with more modest possibilities of experience should be sacrificed to the individuals with a wider life horizon and a higher value of life that goes with it. A common hierarchy of values that stems from the primacy of man remains unchanged if a disputable case arises.²⁵

²¹ On industrial livestock production consult: Krznar, T. (2011). *Znanje i destrukcija*. Zagreb: PERGAMENA, 158-162.

²² Meyer-Abich, K. M. (1997). *Praktische Naturphilosophie*. München: C. H. Beck, 426.

²³ Regan, T. (2004). *The Case for Animal Rights*. Berkeley: University of California Press, 243.

²⁴ Regan, T. The Dog in the Lifeboat: An Exchange. Internet address: <http://www.nybooks.com/articles/1985/04/25/the-dog-in-the-lifeboat-an-exchange/>.

²⁵ This does not mean that the notion of conflict can easily stretch to cases where a person wants to

Neither the circumstance that animals cannot take responsibility and cannot make autonomous decisions, from the point of view of non-anthropocentrists, does not have to be an obstacle to the approval of the appropriate “rights” to them. However, according to the anthropocentric concept of rights, a legal subject may only be a being that at the same time may be the subject of duty, which can therefore be conscious of its duties and which can fulfil them.

The German philosopher Leonard Nelson in regards to the symmetry of the law and duty that reflects upon Kant, already at the beginning of the last century warned that for a certain legal subject is less constitutional to have the interests that could be injured than for some subject of duty. Following this, Nelson develops a maxim that speaks of Kant’s categorical imperative, in the sense that one never acts so that he cannot approve of his method of action, and even if the interests affected by his actions are his own.²⁶ This philosopher, by broadening Kant’s concept of law, does not proceed towards the mind-governed person as the sole proprietor of rights, but introduces also all individuals that are governed solely by interests. All holders of interest are, according to Nelson, at the same time personalities. Then, he states that each person, as such, has dignity that is equal to the dignity of any other person. From this, the person’s subjective right is exercised to respect its interests. According to this fundamental approach to personal dignity, any being who has interests, that is, every person, has the right to respect their interests. This right is the right of personality. Every person is a subject of law, because it is by its notion one subject of interest, it could be said on Nelson’s trail.²⁷

Such clauses of the opening of an order on the equal treatment of human and animal interests make it acceptable and possible to recognize the “dignity” of animals and to install the “rights” of animals, without violating human dignity and human rights.²⁸ Nevertheless, the acceptance of animals into the circle of right-

kill an animal to eat it, although he could be fed in another way. In other words, according to this interpretation, the basic right of the animal to life should have priority over the mere interest of man to eat with the greatest possible pleasure. A similar assessment can also be found in Singer, who condemns the killing of animals for the purpose of eating, unless it is necessary for the survival of man.

²⁶ Nelson, L. (1972). *Kritik der praktischen Vernunft*, 2. Aufl. In L. Nelson, *Gesammelte Schriften in neun Bänden*. (hrsg. von P. Bernays, W. Eichler, A. Gysin, G. Heckmann, G. Henry-Hermann, F. von Hippel, S. Körner, W. Kroebel und G. Weisser). Band 4. Hamburg: Felix Meiner Verlag, 133.

²⁷ Nelson explicitly states that there is no general, philosophically grounded order that, because of the interests of animals, one should ignore one’s own interests. Thus, it may very well be permissible to hurt the interests of an animal if it would be harmed by some prevailing interest of people. This, consequently, also applies in the case when it is not possible otherwise to preserve an interest in one’s own life, or to maintain one’s own spiritual and physical strength, but by destroying the life of an animal. Nelson, L. (1970). *System der philosophischen Ethik und Pädagogik*. 3. Aufl. In: L. Nelson, *Gesammelte Schriften in neun Bänden*. (hrsg. von P. Bernays, W. Eichler, A. Gysin, G. Heckmann, G. Henry-Hermann, F. von Hippel, S. Körner, W. Kroebel und G. Weisser). Band 5, aus dem Nachlass hrsg. von G. Hermann und M. Specht). Hamburg: Felix Meiner Verlag, 174.

²⁸ When Aristotle in *Rhetoric* (1373b6-17) talks about the special and general laws, the general laws he simply called natural laws. The explanation of natural laws is linked with general understandings

holders leads to possible restrictions on the freedom of man, by a certain legal subject who, within the philosophical hierarchy of values, is placed below men.

For this reason, certain experts in legal science (Johannes Caspar) discuss the issue of moral acceptability of animal “rights” in a culture that so far has not considered animals as “moral subjects of comparison”.²⁹ In other words, it should be seen on the basis of which legal - (bio)ethical reasons, a man allows to himself to be bound to the living beings that he has left behind in the history of the development of life.

In this context, Caspar speaks of the modern concept of human dignity, which includes responsibility and empathy for creatures. A man who is capable of acting has brought animals into dependence to himself, and is therefore obliged to take care of their interests and the rights that arise from them. Man’s autonomy has a mutual relationship with responsibility for his conduct. Without this responsibility there is no human dignity either. The greater the dependence of animals from the powerful-acting capable for self-determination man, the more actual becomes his responsibility.

Another element of human dignity, which, according to Caspar, recommends the denial of freedom in favour of the animal “rights”, exists in the quantum of compassion towards the weak, without pursuing own motives. They establish the conditions and contents of personal responsibility and lead the inner motive to overcome the egoism of individual needs and instincts, through the limitations of belonging to the group and beyond the boundaries of one’s own species. Thus, they are the driving power of a type of ethics of solidarity, love for the neighbour, mercy, and that form of humanity that does not ask much for the price, but works.

As an intermediary result of the digression on the consent of the new so called “animal ethics”³⁰ with the usual anthropocentrism, it is possible to postulate this:

- a. Animal “rights” at the expense of humans do not represent any contradiction to the symmetry of rights and duties in the usual (bio)ethics. Nelson’s concept that any personal holder of interest can be a right holder whose

of the just and unjust in harmony with nature, which, according to him, has been recognized by all nations. The Stagiritest believes that with Empedocles it is just that very kind of law, i.e. that the philosopher from Agrigento referred to that right when he was forbidding to kill living beings, since it is impossible for ones to do that justly and the others to do that unjustly. Empedocles (and Pythagoras) claims (DK31B135) that for all living beings applies only one legal norm, and that those who had hurt a living creature shall receive punishments that cannot be redeemed. For more details see: Kaluđerović, Ž. *Ancient Assumptions of Contemporary Considerations of Nature, Life and Non-Human Living Beings*. *Forthcoming*.

²⁹ Caspar, J. (1999). *Tierschutz im Recht der modernen Industriegesellschaft*. Baden-Baden: Nomos Verlagsgesellschaft, 154.

³⁰ About the concept of so called “Animal ethics” consult: Callicott, J. B., Frodeman, R. (eds.). (2009). *Encyclopedia of Environmental Ethics and Philosophy*. Farmington Hills, MI: Macmillan Reference USA, 42-53. See also: Jamieson, D. (2008). *Ethics and Environment*. Cambridge: Cambridge University Press, 112-120.

interests should be treated the same as own interests, is a single systematic bridge between Singer's and Regan's views.

- b. There are (bio)ethical reasons to give animals the "right" to a treatment that is appropriate to them, some would add to this the basic "right" to life, whereas in disputable cases man's right to survive is more valuable.
- c. Restrictions on the action of man for the benefit of animals can rather be (bio)ethically justified as a fulfilment of responsibility and compassion for the weak.³¹

The question may be raised as to how this, by non-anthropocentrists increasingly (bio)ethically required "dignity" of animals, and the resulting animal "rights" are regulated, and whether they are aligned with the consideration of the "moral status" of animals.

According to the "Law on Animal Welfare of the Republic of Serbia",³² Article 4, the basic principles of the protection of animal welfare³³ are based on the mentioned pathocentric concept, since it focuses on the "universality of pain", and Article 2 states that the welfare of animals, that is regulated by this law,³⁴ refers to the "*animals that can sense pain, suffering, fear and stress*".³⁵ When the second point of Article 4 of the Law stipulates that the principle of caring for animals "*implies a moral obligation and the duty of man to respect the animals and*

³¹ These examples and parts of comments have been taken and paraphrased from: Zajler, K. (2006). Dostojanstvo životinja i zakoni ljudi. In Udruženje za zaštitu i prava životinja *Sloboda za životinje*, br. 1. Beograd, 9-15.

³² The Law was posted on the website of the Ministry of Agriculture, Water Management and Forestry of the Republic of Serbia on 19 January 2009 and became effective on 10 June 2009. „Zakon o dobrobiti životinja Republike Srbije”. Internet address: http://www.paragraf.rs/propisi/zakon_o_dobrobiti_zivotinja.html. However, the idea of a human relationship to animals and their protection was regulated in Serbia in 1850 i.e. 1860. For more details consult: Kaluđerović, Ž. Animal Protection and Welfare - Contemporary Examinations. *Forthcoming*.

³³ Animal welfare is usually, however estimated based on internationally accepted concept of the so-called "Five Freedoms". 1. Freedom from hunger and thirst: by ready access to fresh water and a diet to maintain full health and vigor. 2. Freedom from discomfort: by providing an appropriate environment including shelter and a comfortable resting area. 3. Freedom from pain, injury or disease: by prevention through rapid diagnosis and treatment. 4. Freedom to express normal behaviour: by providing sufficient space, proper facilities and company of the animal's own kind, and 5. *Freedom from fear and distress*: by ensuring conditions and treatment which avoid mental suffering. Internet address: http://www.aspcapro.org/sites/pro/files/aspcasv_five_freedoms_final_0_0.pdf. Similar views are stated in the point 4 of Article 5 of the "Law on Animal Welfare of the Republic of Serbia". „Zakon o dobrobiti životinja Republike Srbije”. Internet address: http://www.paragraf.rs/propisi/zakon_o_dobrobiti_zivotinja.html. In London, for example, already in 1824 the first society for the prevention of cruelty to animals was established, whereas a regulation pertaining to animal welfare in the UK was adopted in 1911, and, including numerous amendments, it is still in force today.

³⁴ On the relationship of the "rights" of animals and "welfare" of animals see: Post, S. T. (ed.). (2004). *Encyclopedia of Bioethics I*. New York: Macmillan Reference USA, 183-215.

³⁵ „Zakon o dobrobiti životinja Republike Srbije”. Internet address: http://www.paragraf.rs/propisi/zakon_o_dobrobiti_zivotinja.html. Trans. Ž. Kaluđerović.

take care of the life and welfare of animals”,³⁶ it only shows that it is the obligation of man to protect animals, and it does not entitle the animals the “right” to that protection. This, therefore, refers to the moral duty of man, and not to the “right” of the animals.³⁷ The rights holder can only be a man, because he alone has the dignity of personality, which is an attitude that is in accordance with the usual anthropocentric theses, and it does not differ much from the majority of similar norms in other European countries.³⁸

Article 7, paragraph 1, of the “Law on Animal Welfare of the Republic of Serbia” states that it is forbidden “to abuse animals”, while in paragraph 3 of the same Article it is prohibited to “*deprive an animal of life, except in cases and in the manner prescribed by this Law*”.³⁹ Such argumentation is substantially getting closer to the recognition of the “dignity” of animals. Of course, the trouble with such regulations is an animal is not a legal subject pursuant to the laws of the state, and therefore it cannot even sue anyone, despite the law on their welfare being adopted in the Parliament. Lawsuits cannot be filed on behalf of injured parties that are cows, pigs or hens, since they are animals, and animals cannot participate in any court proceedings.

Article 6, paragraph 1 of the Law states that the owner or holder of the animal is obliged to “*treat the animal with the care of a prudent owner and to provide conditions for keeping and care of animals that correspond to the species, breed, sex, age, as well as physical, biological and production specifics and characteristics of the behaviour and health of the animal; ... The owner or keeper of the animal is responsible for the life, health and welfare of the animal and must take all necessary measures to ensure that no unnecessary pain, suffering, fear and stress or injury is inflicted on the animals*”.⁴⁰

Despite this very well-conceived and harmonized with the highest European standards text,⁴¹ the life of animals in the stays or their position during transport

³⁶ „Zakon o dobrobiti životinja Republike Srbije”. Internet address: http://www.paragraf.rs/propisi/zakon_o_dobrobiti_zivotinja.html. Trans. Ž. Kaluđerović.

³⁷ Consult: Protopapadakis, E. D. (2012). Animal Rights, or Just Human Wrongs?. In E. D. Protopapadakis. (ed.). *Animal Ethics Past and Present Perspectives*. Berlin: Logos Verlag Berlin GmbH, 279-291.

³⁸ For example, “Zakon o zaštiti životinja Republike Hrvatske” (“Law on Animal Protection of the Republic of Croatia”) (Internet address: https://narodne-novine.nn.hr/clanci/sluzbeni/2017_10_102_2342.html), “Zakon o zaštiti i dobrobiti životinja Bosne i Hercegovine” (“Law on Animal Protection and Welfare of Bosnia and Herzegovina”) (Internet address: http://vfs.unsa.ba/web/images/dokumenti/Zako_o_zastiti_i_dobrobiti_zivotinja.pdf), or “Zakon o zaštiti dobrobiti životinja Crne Gore” (“Law on Animal Protection and Welfare of Montenegro”) (Internet address: <http://www.sluzbenilist.me/PravniAktDetalji.aspx?tag=%7B92A63CC4-3155-49BD-BB32-EC9624638EB3%7D>).

³⁹ „Zakon o dobrobiti životinja Republike Srbije”. Internet address: http://www.paragraf.rs/propisi/zakon_o_dobrobiti_zivotinja.html. Trans. Ž. Kaluđerović.

⁴⁰ „Zakon o dobrobiti životinja Republike Srbije”. Internet address: http://www.paragraf.rs/propisi/zakon_o_dobrobiti_zivotinja.html. Trans. Ž. Kaluđerović.

⁴¹ The last around fifty years on the European continent were marked by dramatic changes in the area of ethical-moral and legal-political regulation of the protection and welfare of animals. They are the result of legislative activities of individual states as well as of the transposition into the national

is still quite poor. The answer to why this is so partly lies in the fact that there is no concretization of general legal norms of such laws in the legislation, and partly because the adopted regulations limit the minimum standards that are not consistent with the high goals that are postulated by such laws. And the rest happens simply because the state control is weak and/or because of the logic of capital, namely these things happen because it is necessary to produce as much meat as possible with as little cost as possible.

Regardless of the fact that the Law is “a matter of general interest”, in itself it does not prohibit any injury or damage to animal health, but only prohibits “*stunning, or depriving the animal of life contrary to the provisions of this Law*”.⁴² After all, Article 15 of the Law sets out the nine bases on which an animal may be deprived of life “in a human manner”. These include points 3 and 4, according to which an animal can be slaughtered if it is to be used for food, and if it is used for scientific and biomedical purposes. In the collision of rights, traders of cattle and scientific institutions are favoured, since they can rely on their basic rights to freely exercise their own profession, as well as to the freedom of scientific research,⁴³ namely to the rights guaranteed to them by the highest legal act of the state, the Constitution,⁴⁴ while the “Law on Animal Welfare” is an act of a lower ontological rank, that is, a derived act.

If a (bio)ethical right should be legally perceived as well, it must be possible for it to be sought by court, i.e. the owner of the right must either personally, or if he cannot do so, through a guardian or other legal representative, file a lawsuit before the court for violation of his rights, and possibly procure an exemption. For animals, this is not currently foreseen,⁴⁵ although, for example, Article 1 of the “Law on Animal Welfare of the Republic of Serbia” states: “*This law regulates the welfare of animals, rights, obligations and responsibilities of legal and physical persons,*

legislation of a large number of relevant documents adopted under the auspices of the European Council and the various decisions of the bodies of European Union, and of the standardizing of the legislations of European countries. For more detailed consultations on the perspectives and achievements of bioethical institutionalization in the European Union see: Rinčić, I. (2011). *Europska bioetika: ideje i institucije*. Zagreb: PERGAMENA.

⁴² „Zakon o dobrobiti životinja Republike Srbije”. Internet address: http://www.paragraf.rs/propisi/zakon_o_dobrobiti_zivotinja.html. Trans. Ž. Kaluđerović.

⁴³ The society truly has a complex task to balance between the scientific freedom of research and the responsibility of preserving social norms and social values. “*Scientific freedom ... is an acquired right, generally approved by society as necessary for the advancement of knowledge from which society may benefit*”. But “*scientific freedom and responsibility are basically inseparable*”. Consult: AAAS Committee on Scientific Freedom and Responsibility, *Scientific Freedom and Responsibility*. (1975). Washington DC: American Association for the Advancement of Science, 5. Internet address: <https://www.aaas.org/sites/default/files/SRHL/PDF/1975-ScientificFreedomResponsibility.pdf>.

⁴⁴ See: „Устав Републике Србије”. (2006). Београд: Канц. за сарад. с мед. Владе Републике Србије, 19, 22, 26.

⁴⁵ Consult: https://www.washingtonpost.com/archive/politics/1988/08/07/european-seal-herd-perishing/232cfd6b-9d38-4fee-b710-bf371965ad06/?noredirect=on&utm_term=.9408f6d6c3f6; <https://www.cbsnews.com/news/chronology-of-mad-cow-crisis/>.

*i.e. entrepreneurs, for the welfare of animals, treatment of animals and protection of animals against abuse ...*⁴⁶

If there is an intention to really take care of the protection of animals, it is certainly not enough to devote to them one state goal that protects them so to say indirectly; instead, according to non-anthropocentrists, they should be given the “rights” that are similar to basic rights, to which a lawyer could refer to on their behalf when filing a lawsuit, and which can directly compete with the basic rights of scientists, meat producers and those who carry out the transport of animals. How could these basic “rights” of animals look like?

Firstly, they should be granted the “right” of respect for their animal “dignity”,⁴⁷ “the right” that will protect them from abuse in experiments.⁴⁸ The conflict between monkeys, dogs and cats harassed in experimental laboratories,⁴⁹ on the one hand, and the interests of medicine, pharmaceutical industry, and researchers on the other hand, could induce people to finally seriously assess whether animal suffering⁵⁰ is in a proper relationship to the benefit for man that comes out of it.⁵¹ In this assessment, it will be also significant whether the dignity of man justifies to deprive other living beings of their “dignity” in order to carry out sometimes suspicious experiments on them,⁵² whose results can often not

⁴⁶ „Zakon o dobrobiti životinja Republike Srbije”. Internet address: http://www.paragraf.rs/propisi/zakon_o_dobrobiti_zivotinja.html. Trans. Ž. Kaluđerović.

⁴⁷ Justified care of the protection of non-human living beings does not mean that the author of this paper considers that some kind of “moral status” should be recognized for animals, that would be in conformity to the human moral phenomena. Taking care of all current and future “rights” of animals, in the end, is essentially a human task.

⁴⁸ Except in the “Law on Animal Welfare of the Republic of Serbia”, experiments with experimental animals are also regulated in the various rulebooks, such as the „Pravilnik za rad sa eksperimentalnim životinjama Univerziteta u Novom Sadu” (“Rulebook for working with experimental animals at the University of Novi Sad”). This “Rulebook” defines: “*Protected animal species, experimental procedures (ethical and non-ethical), principles of ethics of experimental work on animals, competence of researchers for such work, composition and manner of establishment of the Ethics Committee for the protection of the welfare of experimental animals at the University of Novi Sad as well as the scope of work, tasks and rules of work of the committee (hereinafter: the Ethics Committee), the procedure for obtaining an opinion on experimental work on animals by the Ethics Committee, as well as the procedure in case of non-compliance with the rules of operation of the Ethics Committee and decisions made pursuant to the Rulebook*”. „Pravilnik za rad sa eksperimentalnim životinjama Univerziteta u Novom Sadu”. Internet address: <https://www.uns.ac.rs/index.php/rs/univerzitet/dokumenti/send/7-pravilnici/24-pravilnik-za-rad-sa-eksperimentalnim-zivotinjama>. Trans. Ž. Kaluđerović.

⁴⁹ On scientific experiments on animals see: Aramini, M. (2009). *Uvod u bioetiku*. Zagreb: Kršćanska sadašnjost, 403-405; Frey, R. G. (2005). Animals and Their Medical Use. In Cohen, A. I., Wellman, C. H. *Contemporary Debates in Applied Ethics*. Oxford: Blackwell Publishing, 91-103.

⁵⁰ Consult: <https://www.worldanimalprotection.org/>.

⁵¹ Article 6 of the “Universal Declaration of Animal Rights” states: “*Experiments on animals entailing physical or psychological suffering violate the rights of animals. 2°-Replacement methods must be developed and systematically implemented*”. “Universal Declaration of Animal Rights”. Internet address: <http://www.esdaw.eu/unesco.html>.

⁵² Clement of Alexandria, Maimonides, Tomas Aquinas, Kant and some contemporary authors as an argument why animals should not be experimented with, stated the subsequent potential

even be applied to man.

Animals should, furthermore, be guaranteed the basic “right” to life appropriate to their species,⁵³ the view that is based on the parts of the fourth and fifth articles of the “Universal Declaration of Animal Rights”: *“Wild animals have the right to live and reproduce in freedom their own natural environment ... Any animal which is dependent on man has the right to proper sustenance and care”*.⁵⁴

This also applies to the fundamental “right” of animals to life. As long as modern societies are meat-eating societies, it will be possible only to gradually implement this basic “right” of animals and therefore anchor it only in the vicinity of closer legal regulations. This basic “right” would primarily prohibit the excessive production of animals for slaughter, which then also leads to their destruction. Then, in order to gradually achieve the protection of life for the benefit of animals, a different programming of eating habits of new generations of people would have to occur.

In guaranteeing the basic “rights” to animals, which, in addition to determining the state’s goal, should also enter into the Constitution,⁵⁵ all of this could be taken into consideration together with the statement that any vertebrate has the right to have its dignity respected, and to a life that is suitable to its species. According to this interpretation, man would be permitted to intervene only for reasons of public interest, certainly within the framework of the law.⁵⁶

The first of these two sentences, in which in the form of a basic “right” animals are granted the “right” to “dignity” and life appropriate to the species, would probably mean that the keeping of animals in massive farming, which is being practiced today, due to the Constitution would have to, at some point be abolished and replaced by keeping animals in the manner appropriate to their species. The second sentence, according to which man is permitted to interfere in the life of animals for reasons of public interest, would be a regulation between

dehumanization of man himself. Similarly writes already mentioned “father” of European bioethics F. Jahr: *“... Senseless cruelty towards animals is an indication of an unrefined character becoming dangerous towards the human environment as well”*. Jahr, F. (2012). *Animal Protection and Ethics*. In A. Muzur, H.-M. Sass. (eds.). *Fritz Jahr and the Foundations of Global Bioethics. The Future of Integrative Bioethics*. Berlin – Münster – Wien – Zürich – London: Lit Verlag, 10.

⁵³ Article 1 of the “Universal Declaration of Animal Rights” states: *“All animals have equal rights to exist within the context of biological equilibrium. This equality of rights does not overshadow the diversity of species and of individuals”*. “Universal Declaration of Animal Rights”. Internet address: <http://www.esdaw.eu/unesco.html>.

⁵⁴ “Universal Declaration of Animal Rights”. Internet address: <http://www.esdaw.eu/unesco.html>.

⁵⁵ On the basis of the 1992 plebiscite, in Switzerland, the “Constitution” guarantees the inherent value of animals, i.e. it already speaks of “dignity of Creature” (“die Würde der Kreatur”). Consult also the latest version of the “Federal Constitution of the Swiss Confederation”, Article 120, paragraph 2 (“Non-human gene technology”). Internet address: <https://www.admin.ch/opc/en/classified-compilation/19995395/index.html#a120>.

⁵⁶ In order to make this proposal be legally and dogmatically viable and practical for implementation, it would be necessary to implement a specific and serious research.

the absolute protection of the life of animals and the relative readiness of a society which to some degree tortures animals, to take care of this protection of life. Movement of the society in that direction should represent an intention of the state which is to protect the animals, which is connected with the continuous flow of smaller and larger steps of the legislator, who will take care of that state's goal by promoting the appropriate way of life.

All this can seem pretty utopian, but time will show if people are mature for such a step in evolution. The present ecological, and not only ecological, crisis urges mankind to, among other things, determine in a new way its attitude towards animals. *Homo sapiens* is the first species that has ever been able to freely decide whether they will give up eating other living beings. The first step has been made - people have ceased to eat each other for a long time, and cannibalism is barely present in the so-called "primitive" nations. Whether man will soon make a second step by stopping to eat animals, to respect the fundamental "right" animal to life? It is unlikely that this will happen in the foreseeable future, but this does not mean that we should not continue to work on strengthening the protection and welfare of non-human living beings.

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