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Epidemiology of colorectal cancer: global trends, incidence of colorectal cancer in the Republic of Uzbekistan (2012-2017)

Abstract

Objective of the study: oncoepidemiological assessment of global trends in colorectal cancer (CD), study of the incidence of colorectal cancer (colorectal cancer) in the Republic of Uzbekistan in dynamics (2012-2017).

Materials and methods: based on the use of Globocan the analysis of the situation on RCT in the world was made. In the Republic of Uzbekistan, an assessment of the incidence of colorectal cancer, trends and average annual average age was made. The necessity of conducting oncoepidemiological studies on CDR in Uzbekistan was substantiated.

Results: global trends in morbidity and mortality in CDR show existing differences depending on the territory, economic level of development. It is shown that there are sexual peculiarities, the CDR appears more in men and the ratio with women is 1.25:1.0. The number of deaths is also increasing and their ratio is 1.22:1.0. The article studies the oncoepidemiological situation with regard to RCT in Uzbekistan - morbidity in dynamics, their trends, which tend to increase, which determines the need for further research on territorial differences and search for causal factors of RCT origin.

Keywords: colorectal cancer, oncoepidemiology, republic of Uzbekistan, world trends, morbidity, mortality, colorectal cancer

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Abbreviations: MN, malignant neoplasms; WHO, world health organization, CD, colorectal cancer

Introduction

Malignant neoplasms (MN) are one of the most difficult problems of the whole mankind, as they can occur at any age, organ, causing rapid spread and growth, which determines the global problem of finding ways of their early diagnosis and treatment, risk factors, which in turn leads to oncoepidemiological studies. They allow to carry out an analytical assessment of the existing situation, with the definition of indicators of morbidity, mortality, one-year mortality, five-year survival, on the basis of which it is possible to calculate trends, to calculate prognostic indicators for the coming years, which will make it possible to make managerial decisions on the organization of oncoepidemiological service work as a whole, to evaluate the possibilities of modern methods of diagnostics and treatment of patients with MN, to make corrections, to identify risk factors.

The scale and globality of oncopathology problems can be clearly seen in the data of the world statistics, which show an increase in the number of registered MN patients, which is about 12million new cases annually and more than 6.5million deaths, with a growth rate of more than 2%, which exceeds by 0.5% the growth of the world population.[1–4]

According to the latest WHO data analysis of OA statistics showed that in 2012 8.2million cancer deaths were detected, despite the fact that according to the prognostic data it was 1.7million, i.e. one can see the emerging trend and the globality of OA problem.[3–11]

In the given article the analysis of oncoepidemiological situation on one of the significant and most frequently occurring MN - colorectal cancer (CD) is carried out on the basis of Globocan data, on the basis of existing world tendencies at present. Also, the analysis of colorectal cancer (colorectal cancer) morbidity in the Republic of Uzbekistan for the period from 2012 to 2017 was conducted.

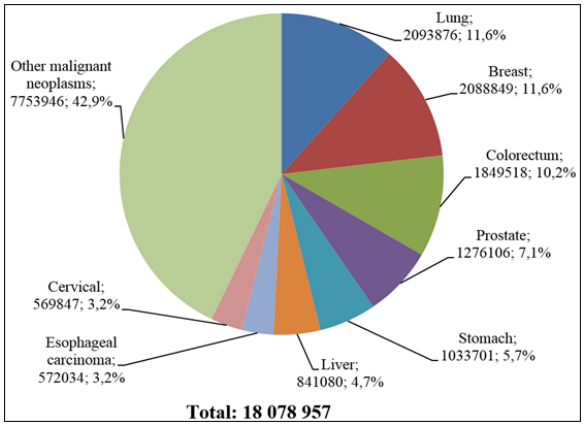
Purpose

Oncoepidemiological analysis of CDF worldwide, study of the dynamics of the incidence of colorectal cancer in the Republic of Uzbekistan (2012-2017). Materials and methods: statistical data on world trends on Globocan; study of ROC morbidity on the basis of data from statistical report on MN morbidity - 7-SSV form using descriptive and analytical methods of modern oncoepidemiology. The “rough” and “standardized” morbidity indicators have been calculated based on the generally accepted method used in modern sanitary statistics. The review and processing of the obtained materials were carried out using Microsoft Office: Excel programs; age trends of morbidity were determined on the basis of linear regression analysis.[4,12–14] CDR is the most formidable pathology among MN, which includes the following nosological units: colorectal cancer, rectal cancer, anal canal cancer. In this connection, the analysis of the world morbidity and mortality rates, as a whole at CDR, as well as separately for each nosology in comparative aspect depending on sex and territory of distribution.

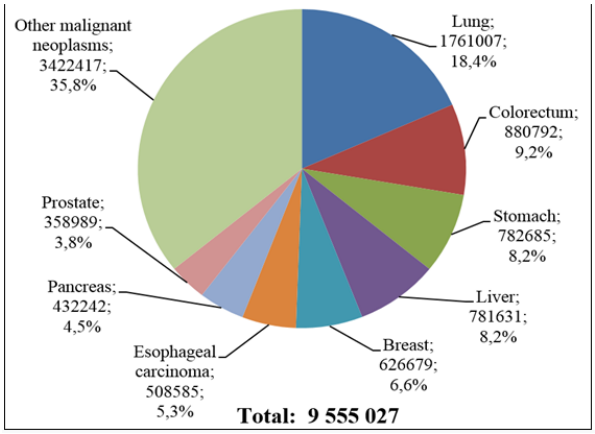
Results

As the data of world statistics show, RRS is the third most widespread pathology among MN and the second most frequent in

the mortality structure, with its frequency increasing among persons in the age group starting from the age of 40, reaching its peak values at the age of 65-75years (Figure 1).



(A)



(B)

Figure 1 The number of newly diagnosed cases of (A) and deceased (B) patients from malignant neoplasms in the world in 2018.[2]

The morbidity and mortality of CDM worldwide varies considerably. Globocan statistical data show that in 2018 the number of patients with this pathology in the world amounted to 1 849 518 cases, with colorectal cancer (CIC) - 1 096 601 (59,3%); rectum cancer (CIC) - 704 376 (38,1%); anal canal cancer (AC) - 48 541 (2,6%) (Figure 2). By sex, the number of cases of RDH among men was 1,025,215 (55.5 per cent) and among women 823,303 (44.5 per cent), with a ratio of 1.25:1.0 (Figure 3).

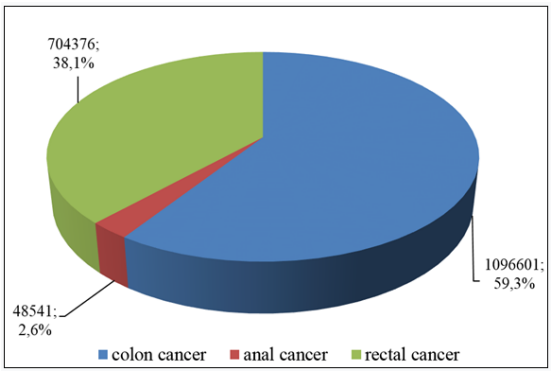


Figure 2 The number of newly diagnosed CRC patients worldwide.[2]

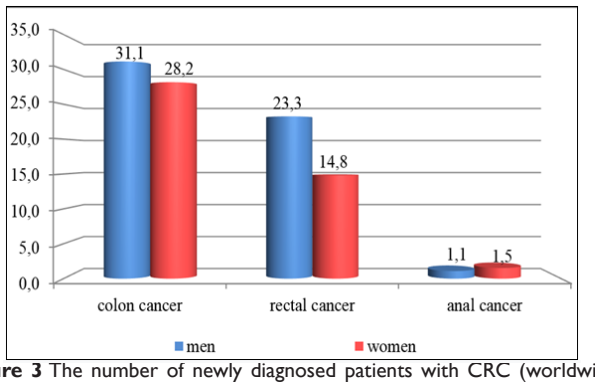


Figure 3 The number of newly diagnosed patients with CRC (worldwide) disaggregated by sex.[2]

The number of died from this pathology in 2018 in the world amounted to 9 555 027 cases, while colorectal cancer (CIC) - 551 269 (62.6%); rectum cancer (CIC) - 310 394 (35.2%); anal canal cancer (AC) - 19 129 (2.2%) (Figure 4). With a breakdown by sex, the number of deaths from RTW among men was 484,224 (54.9%); and among women, 396,568 (45.0%), a ratio of 1.22:1.0 (Figure 5).

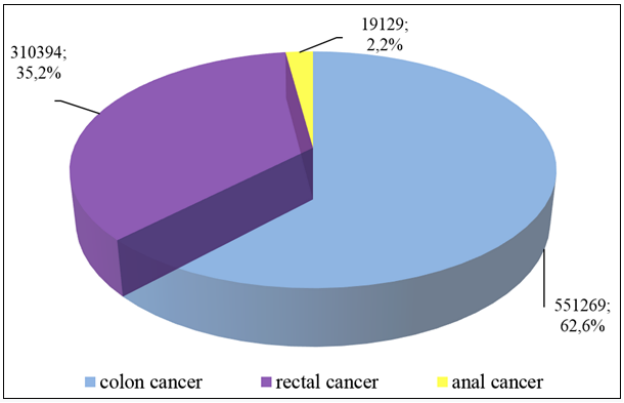


Figure 4 The number of deceased patients from CRC worldwide.[2]

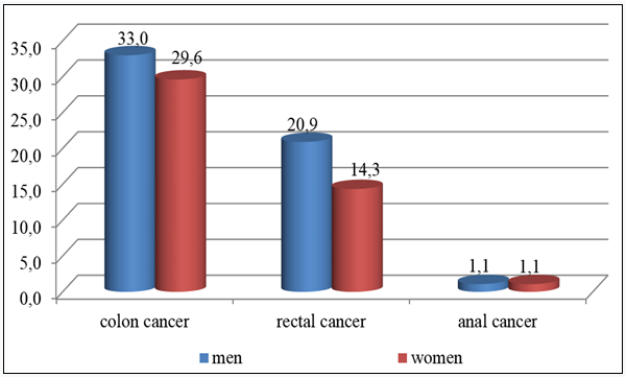


Figure 5 The number of patients who died from CRC (worldwide) disaggregated by sex.[2]

According to the number of cases of first-time detected patients with ARR from 2018, the largest number of cases was territorially determined in East Asia - 736,573 (39.8%), North America - 179,771 (9.7%), Central and Eastern Europe - 164,998 (8),9%), Western Europe - 138 820 (7.5%), Southern Europe - 119 949 (6.5%), South America - 97 600 (5.3%), Southeast Asia - 95 223 (5.1%), South and Central Asia - 88 033 (4.8%), Northern Europe - 75 900 (4.1%). In

Western Asia, Australia and New Zealand, Central America, Northern, Eastern and Western Africa the number of registered patients was much less than in the above-mentioned regions and made from 2.1 to 0.7%. The smallest number of patients from 10,886 (0.6%) was registered in the Caribbean Peninsula, Milanesia - 906 (0.05%), Polynesia - 113 (0.01%) and Micronesia - 96 (0.01%). According to these data, it can be clearly seen that there is territorial variability in the incidence of CDR on a global scale. Conducting standardized morbidity calculations from CRF confirms a significant variation of the indicator depending on the territory (Figure 6).

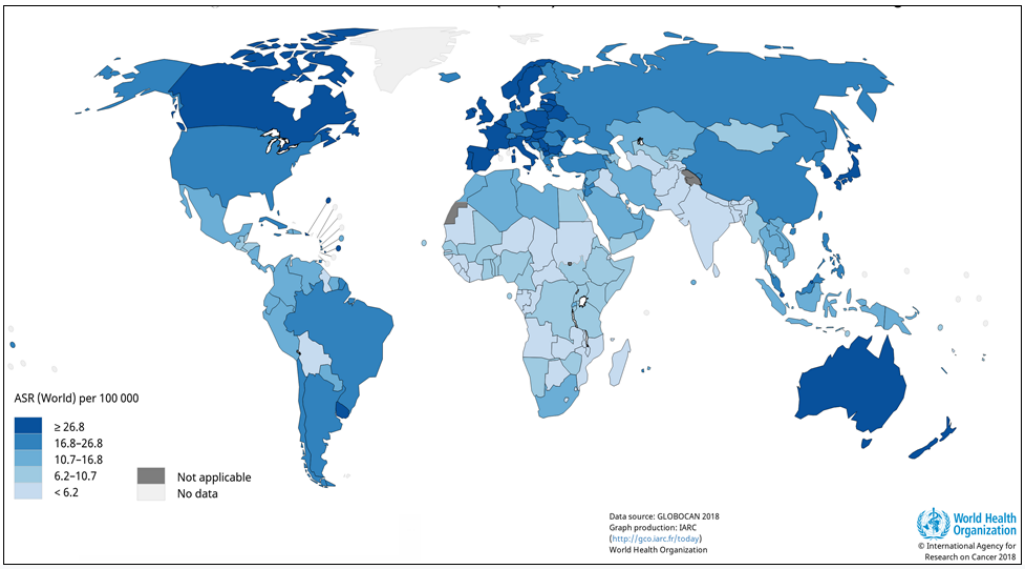


Figure 6 Cartogram for standardized indicators of the incidence of CRC in the world.

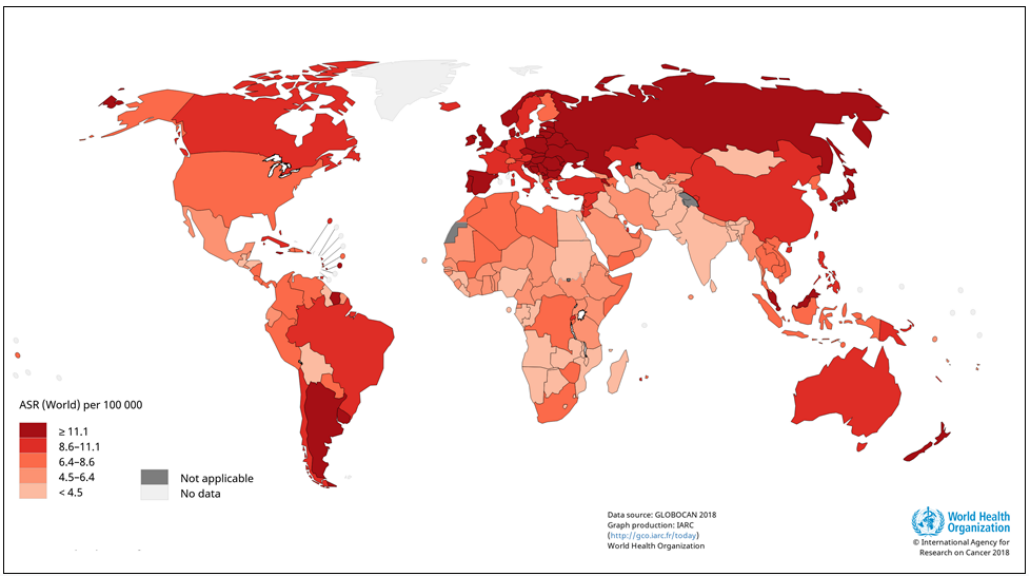


Figure 7 Cartogram for standardized mortality rates from CRC.

The highest level of DRD according to IARC is found in Australia, New Zealand, North America, Europe and Japan, apparently due to the impact of carcinogenic environmental factors as well as changes in lifestyle and nutrition patterns; low levels are found in Asia and Africa (India, Oman, Pakistan, Algeria, etc.), low rates may be due to the lack of and inability to provide timely diagnosis, as well as low economic and development capacity in these countries. According to Ferlay J & Parkin DM[15–18] the analysis shows that in regions with high morbidity rates in different directions, there is a stabilization of morbidity rates in Europe and a decrease in North America, the ratio between ROC and rectum is 2:1, in North America, Australia and New Zealand, while in countries with low morbidity it is equalized to 1:1.[19,20]

The mortality analysis of current trends in the world also shows that there is territorial variability. The highest number of deaths in 2018 was observed in the following countries: East Asia - 325 128(36.9%), Central and Eastern Europe - 94 545 (10.7%), North America - 64 121 (7.3%), South and Central Asia - 63 401(7.2%), Western Europe -61 304 (7.),0%), Southern Europe - 53 975(6.1%), Southeast Asia - 52 475 (6.0%), South America - 48 793 (5.5%), Northern Europe - 32 659(3.7%), Western Asia - 20 418 (2.3%), Eastern Africa - 12 201 (1.4%), North Africa accounted for 10,902(1.2%), Central America

for 9,614 (1.1%), West Africa for 8,568 (1.0%) and slightly fewer deaths were recorded in Australia and New Zealand for 7,424 (0),8 per cent), the Caribbean Islands 6,259 (0.7 per cent), Middle Africa 4,562 (0.5 per cent), South Africa 3,801 (0.4 per cent), Melanesia 561 (0.1 per cent), Micronesia 51 (0.006 per cent) and Polynesia 30 (0.003 per cent) (Figure 2).[7]

Based on available data and analysis of emerging trends in the number of deaths from CDM, it can be concluded that mortality in some countries is decreasing in dynamics (USA, Australia, New Zealand, Austria, France), it may be associated with an increase in the economic potential of these countries and the Human Development Index (HDI), as well as the quality of diagnosis and use of new modern optimized methods of treatment, the introduction of screening programs that contribute to the survival of this category of patients. However, despite the available modern methods of diagnosis and treatment of this pathology, there has been an increase in mortality rates in countries with low levels of economic development and high urbanization, with the formation of disturbed behavioral reactions (homosexuality, lesbianism, etc.), as well as peculiarities of nutrition (South, East and Central Asia, East, North and Central Africa). In countries in transition, the increase in mortality from CDM is mainly due to the lack of screening programmes and activities to raise awareness of the existence of such a formidable pathology as MN, including CDM, the reduction of mortality from which directly depends on the reduction of existing risk factors, consequences of changes in lifestyle and nutrition patterns.

A review of global trends in morbidity and mortality from CDM shows that the problem is global and that studying oncoepidemiological features is important. In this regard, an attempt has been made to analyze the existing state of morbidity assessment of the Republic of Uzbekistan in dynamics for 2012-2017. The study and analysis of absolute number of ROC patients during 6-year period (2012-2017) showed that in the Republic of Uzbekistan there were 3210 cases of ROCs (2,58%) and all MN - 124 383 (Figure 8). This shows that this pathology (OTC), as well as worldwide, tends to increase, presenting a topical problem of oncoepidemiology and oncologoproctology. In Uzbekistan, ROC is ranked 4th among MNRs, after breast, stomach and lung cancers.

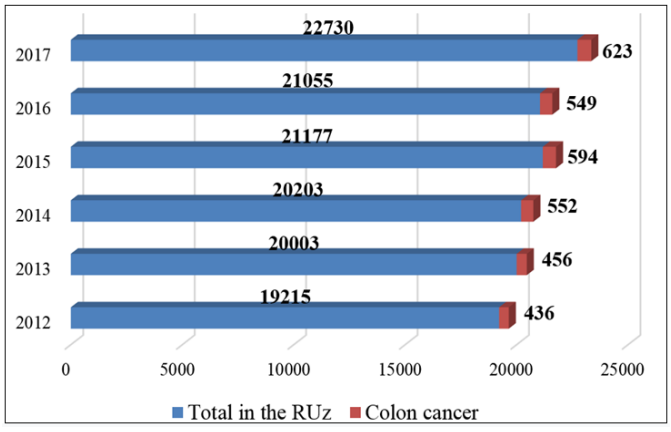


Figure 8 The absolute number of patients with colon cancer and malignant neoplasms in the dynamics of the Republic of Uzbekistan for 2012-2017yy.

During the research period (2012-2017), 3210 patients were registered in the Republic of Uzbekistan for the first time in their lives with the diagnosis of ROC. The age breakdown of patients was as follows: up to 15years - 4 (0,12%), 15-17years - 7 (0,22%), 18-44 years - 459 (14,3%), 45-64 years - 1665 (51,9%), 65years and older - 1075 (33,5%) (Figure 9). As it can be seen from Figure 9, the specific weight of patients had unimodal growth with a peak at the age of 45-64years - 51.9%.

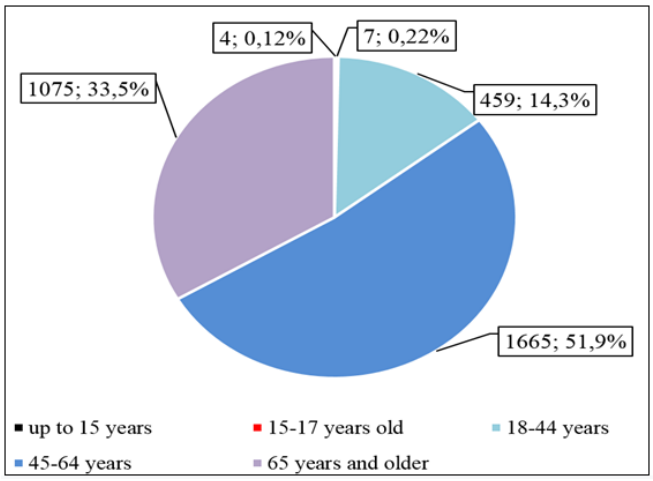


Figure 9 Distribution of colon cancer patients in Republic of Uzbekistan for the study period.

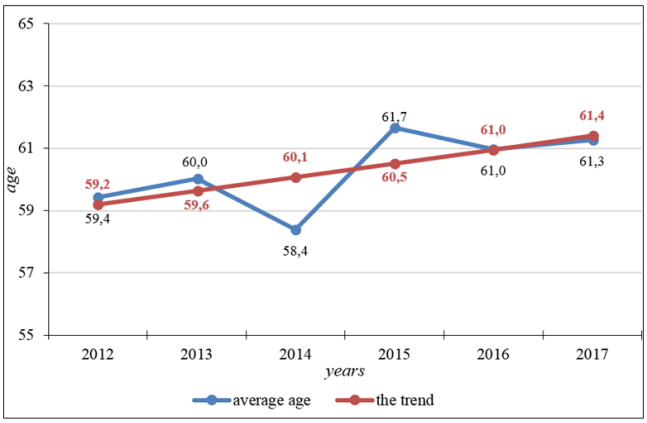


Figure 10 The dynamics of the middle age of patients with colon cancer in the Republic of Uzbekistan for 2012-2017yy.

Materials and methods

Average annual average age of ROC patients in the Republic of Uzbekistan was 60.3±0.32years, 95% of MI=59.7-60.9years. In dynamics, this indicator tended to increase during the leveling, and the average annual growth rate was TPA=+0.6%.

The conducted analysis has shown that the greatest number of patients with ROCs at the RIs is observed in the age group 45-64years, with the average age of patients being 60.3years (Table 1). The analysis of the incidence of ROCs in the RIs in terms of volume meets the requirements for conducting a comparative epidemiological study. The above absolute numbers of ROC patients cannot fully reflect the peculiarities of distribution, morbidity levels in dynamics, their age peaks, which requires in-depth analysis with the calculation of basic oncoepidemiological indicators and their standardization.

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Table 1 Distribution of colorectal cancer patients in Uzbekistan

Name	2012	2013	2014	2015	2016	2017
Middle Age	59,4	60,0	58,4	61,7	61,0	61,3
Average error (m)	0,9	0,8	0,8	0,7	0,7	0,7
Trend	59,2	59,6	60,1	60,5	61,0	61,4

Calculation of the average annual rough morbidity rate of ROC showed the following values, dynamically averaging 1.73±0.050/0000 (95% CI=1.6-1.80/0000). While leveling this indicator, there was a tendency to decrease, the average annual growth rate was TPR=+5.6% (Figure 11).

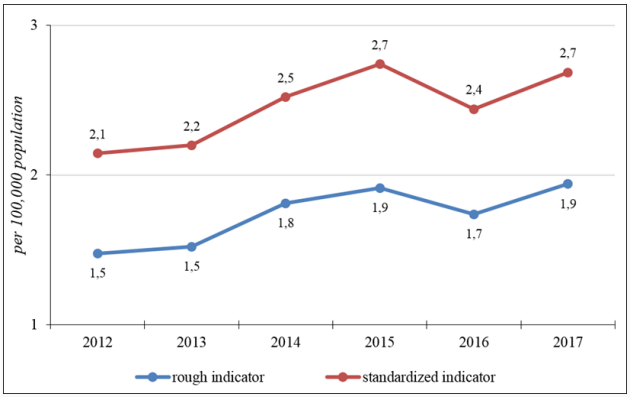

Figure 11 Dynamics of colorectal cancer incidence rates in Republic of Uzbekistan for 2012-2017yy.

The dynamics of rough and standardized ROC indicators is shown in Figure 11. As can be seen from the figure, the standardized ROC incidence rate in dynamics was 2.5±0.060/0000 (95% CI=2.3-2.60/0000). In dynamics, the standardized indicators were stable and equaled to the annual average, the growth rate was TPR=+4.4%. Age-specific features of RDC morbidity in RUz. Taking into account the fact that morbidity of MN has its own peculiarities, one of the distinctive features is the age aspect. In this regard, the occurrence of ROCs in different age periods was studied. As can be seen from Table 1, during the study period the lowest morbidity rate was observed in the age group up to 15years - 0.008±0.0020/0000 (95% CI=0.005-0.0110/0000) (incidence of disease in single cases); aged 15-44years, the incidence was 0.50±0.030/0000 (95% CI=0.4-0.650/0000); 45-64years, 5.34±0.200/0000 (95% CI=4.9-5.70/0000); 65years and older had the highest incidence of 14.26±0.390/0000 (95% CI=13.5-15.00/0000).

As can be seen from the data obtained, the highest morbidity rate was determined at age 65 and over and was 14.260/0000, while the lowest rate was 0.0080/0000 until age 15 (Figure 12). Trends in the incidence of ROCs in different age groups allowed us to characterize and assess the general trend, which showed relative stability, but a general tendency of growth depending on age. The overall increase or decrease in the incidence of ROCs in the population is due to an increase in incidence in some age groups or a decrease in others. The morbidity trend for ROCs aged 65years and older had an upward trend, while the average annual rate of return for the same indicators was TPR=+5.2%. In other age groups, the incidence rate was - 15-44years (Tub=2.3%), 45-64years (Typ=+4.9%) (Figure 13).

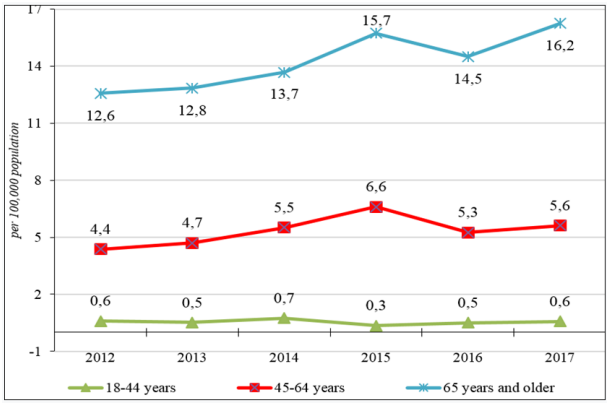

Figure 12 Dynamics of age-related colorectal cancer morbidity in the Republic of Uzbekistan for 2012-2017yy.

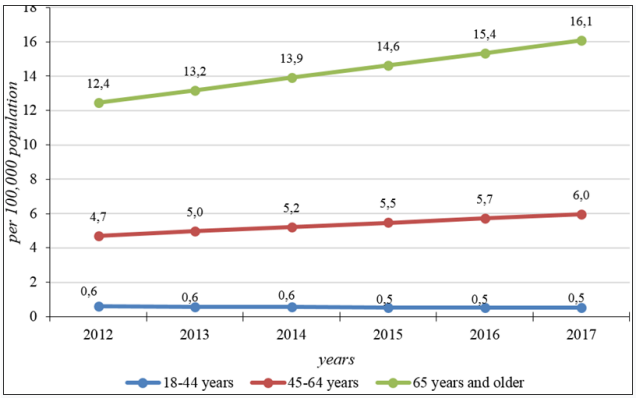

Figure 13 Trends in age-related colorectal cancer morbidity in the Republic of Uzbekistan for 2012-2017yy.

Conclusion

As a result of absence of sharp leaps in the growth of morbidity in the studied age groups, the rate of morbidity in the dynamics remained at the level of average values for the whole country. The analysis of world tendencies of the Kyrgyz Republic shows the existing steady growth of this pathology, presence of territorial differences. The highest rates are registered in the countries of Europe (Slovakia, Hungary, Czech Republic, Netherlands), while the lowest ones are registered in the countries with low or medium economic level of development, where there are no screening programs and there is no possibility to apply modern methods of diagnostics and treatment.

Taking into account the global nature of the situation on RCT, the oncoepidemiological situation on RCT in the Republic of Uzbekistan was assessed in dynamics with the calculation of morbidity index and its standardization, which is also confirmed by the growth of this pathology in our country, as the rate of morbidity growth is in dynamics Tp=+4.4%, and the average annual age of patients is 60.3 (Tp=+0.6%). ROC disease is most often found at the age of 65years and older, which may be due to an increase in risk factors, peculiarities of nutrition, as well as the processes of biological "aging" of the body. It is possible that there are also territorial dependencies and fluctuations in morbidity and mortality rates from this pathology, which requires further oncoepidemiological studies on an extended scale.

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Conflicts of interest

The authors state that there is no conflict of interest.

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