Abstract

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A QUINQUENNIAL POPULATION-BASED STUDY OF PATIENTS WITH GASTRODUODENAL ULCER DISEASE AND ULCER BLEEDING IN SUMY REGION AND UKRAINE

Introduction: The bleeding is still the most frequent complication of the ulcer disease. An etiological relationship between these diseases may be very logical but not always, because it depends on many factors of the nature of ulcer process and its causes, for example, clinico-epidemiological ones. The purpose of the study was to present a clinico-epidemiological description and to search interrelations between the demographic rates, the incidence and the prevalence of the ulcer disease of the stomach and the duodenum, and hospital admission episodes statistics on ulcer bleedings in Ukraine and Sumy region.

Materials and methods: The authors analyzed data collection for a five-year period from 2009 to 2013, using the official statistical annual indicators like the resident population, the incidence and the prevalence of the ulcer disease of the stomach and the duodenum, and the rate of hospital admission episodes on ulcer bleedings. The analysis included two calculations for Spearman rank correlation(ρ) and linear Bravais-Pearson correlation(r).

Results: For Ukraine, it was estimated a significant correlation between the incidence and the prevalence of the ulcer disease(p=0,016, r=0,9433; p<0,0001, ρ=1); between the prevalence and the resident population(p=0,02, r=0,9343; p<0,0001, ρ=1); between the incidence and the resident population(p=0,0003, r=0,9957; p<0,0001, ρ=1). For Sumy region, a statistical significant Bravais-Pearson correlation was in case of hospital admission episodes on ulcer bleedings and of the resident population(p=0,0482, r=0,8813; p=0,16, ρ=0,7). Spearman rank correlation was significant for the prevalence of the ulcer disease and the resident population of the region(p=0,058, r=0,86; p<0,001, ρ=1).

Conclusions: The issue of demographic decrease of the Ukraine's population does influence on the incidence and the prevalence of the ulcer disease, but it does not influence on hospital admission episodes with ulcer bleedings. On the country's level, it appears an increasing trend of hospital admission episodes of ulcer bleedings. However, on the example of Sumy region, it should be noted that these trends are different, namely, it received a lack of correlation between the population's decrease and the incidence of the ulcer disease or hospital admission episodes on ulcer bleedings. Moreover, Sumy region demonstrates a trend of decrease of hospital admission episodes on ulcer bleedings.

Keywords: gastroduodenal disease, ulcer bleeding, epidemiology, population

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Резюме

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П'ЯТИРІЧНЕ ПОПУЛЯЦІЙНЕ ДОСЛІДЖЕННЯ ХВОРИХ З ВИРАЗКОВОЮ ХВОРОБОЮ ШЛУНКА ТА ДВАНАДЦЯТИПАЛОЇ КИШКИ, УСКЛАДНЕНОЇ КРОВОТЕЧЕЮ, В УКРАЇНІ ТА СУМСЬКІЙ ОБЛАСТІ

Вступ: Найбільш частим ускладненням виразкової хвороби є кровотеча. Етіологічний зв'язок між цими двома захворюваннями логічний, але не завжди, оскільки він залежить від багатьох факторів природи виразкового процесу та інших чинників ґенезу, у тому числі клініко-епідеміологічних.

Мета роботи: клініко-епідеміологічний опис з пошуком взаємозв'язків демографічних показників, захворюваності та поширеності(хворобливості) щодо виразкової хвороби шлунка і дванадцятипалої кишки, а також статистики епізодів госпіталізації з приводу виразкових кровотеч в Україні і Сумській області.

Матеріали і методи: У роботі проаналізовано дані за останні п'ять років (2009-2013рр.) згідно офіційних статистичних показників: постійне населення, захворюваність і хворобливість на виразкову хворобу шлунка та дванадцятипалої кишки, кількість стаціонарних хворих з виразковими кровотечами. Для аналізу використано методи кореляції (рангова Spearman [ρ], лінійна Bravais-Pearson [r]).

Результати: В Україні статистично значимий зв'язок був між хворобливістю і захворюваністю на виразкову хворобу (p=0,016, r=0,9433; p<0,0001, ρ=1); між хворобливістю і постійним населенням (p=0,02, r=0,9343; p<0,0001, ρ=1); між захворюваністю і постійним населенням (p=0,0003, r=0,9957; p<0,0001, ρ=1). Для Сумської області підраховано, що статистично достовірна кореляція згідно Bravais-Pearson мала місце між кількістю випадків шлунково-кишкової кровотечі і постійним населенням області(p=0,0482, r=0,8813; p=0,16, ρ=0,7). Мала місце значима рангова кореляція між хворобливістю на виразкову хворобу та постійним населенням області (p=0,058, r=0,86; p<0,001, ρ=1).

Висновки: Явище демографічного скорочення населення України впливає на захворюваність і хворобливість на виразкову хворобу шлунка та дванадцятипалої кишки, але воно не впливає на кількість випадків госпіталізацій з приводу виразкової кровотечі. На рівні країни існує тенденція до зростання кількості епізодів кровотеч. Однак, на прикладі Сумської області виявлені протилежні особливості: відсутність зв'язків між скороченням населення і захворюваністю виразковою хворобою шлунка та дванадцятипалої кишки, зв'язок між демографічним скороченням і зменшенням кількості виразкових кровотеч. У Сумській області спостерігається зменшення кількості випадків госпіталізацій через виразкові кровотечі.

Ключові слова: гастродуоденальна виразка, виразкова кровотеча, епідеміологія, популяція

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ПЯТИГОДИЧНОЕ ПОПУЛЯЦИОННОЕ ИССЛЕДОВАНИЕ БОЛЬНЫХ С ЯЗВЕННОЙ БОЛЕЗНЬЮ ЖЕЛУДКА И ДВЕНАДЦАТИПЕРСТНОЙ КИШКИ, ОСЛОЖНЕННОЙ КРОВОТЕЧЕНИЕМ, В УКРАИНЕ И СУМСКОЙ ОБЛАСТИ

Вступление: Наиболее частым осложнением язвенной болезни является кровотечение. Этиологическая связь между двумя заболеваниями логична, но не всегда, поскольку она зависит от многих факторов природы язвенного процесса и других причин, в том числе клинико-эпидемиологических.

Цель работы: клинико-эпидемиологическое описание с поиском взаимосвязей демографических показателей, заболеваемости и распространенности (болезненности) язвенной болезнью желудка и двенадцатиперстной кишки, а также статистики эпизодов госпитализации по язвенным кровотечениям в Украине и Сумской области.

Материалы и методы: В работе проанализированы данные за последние пять лет (2009-2013 гг.) официальных статистических показателей: постоянное население, заболеваемость и болезненность язвенной болезнью желудка и двенадцатиперстной кишкой, количество стационарных больных с язвенными кровотечениями.

Результаты: В Украине статистически значимая связь была между распространенностью и заболеваемостью язвенной болезнью ($p=0,016$, $r=0,9433$; $p<0,0001$, $\rho=1$); между распространенностью и постоянным населением ($p=0,02$, $r=0,9343$; $p<0,0001$, $\rho=1$); между заболеваемостью и постоянным населением ($p=0,0003$, $r=0,9957$; $p<0,0001$, $\rho=1$). Для Сумской области подсчитано, что статистически достоверная корреляция по Bravais-Pearson была между количеством случаев желудочно-кишечных кровотечений и постоянным населением ($p=0,0482$, $r=0,8813$; $p=0,16$, $\rho=0,7$). Имела место значимая ранговая корреляция между распространенностью язвенной болезни и постоянным населением области ($p=0,058$, $r=0,86$; $p<0,001$, $\rho=1$).

Выводы: *Явление демографического сокращения населения Украины влияет на заболеваемость и распространенность язвенной болезни желудка и двенадцатиперстной кишки, но оно не влияет на количество случаев госпитализаций по язвенному кровотечению. На уровне страны существует тенденция к увеличению количества эпизодов кровотечений. Однако, на примере Сумской области выявлены противоположные особенности: отсутствие связей между сокращением населения и заболеваемостью язвенной болезнью желудка и двенадцатиперстной кишки, связи между демографическим сокращением и уменьшением количества язвенных кровотечений. В Сумской области наблюдается уменьшение количества случаев госпитализаций по язвенному кровотечению.*

Ключевые слова: гастродуоденальная язва, язвенное кровотечение, эпидемиология, популяция

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Introduction

At the beginning of the 21st century the world has a fixed trend of a decrease in the incidence rates of the ulcer disease of the stomach or the duodenum in the light of an eradication therapy for Helicobacter pylori and a conservative control of the stomach acidity[1;2]. Also it was determined that the incidence of the most frequent complication of the ulcer disease, known as a bleeding, continues to be stable or even growing [1-5]. Despite the

uncomplicated ulcer disease becomes more eventless concerning hospital admissions, however, the ulcer bleeding is very demanding for an in-patient treatment, especially for female patients, taking into account different clinical risks[2;6;7].

The epidemiological description on these issues is mainly best done in the most industrialized countries like the USA, the UK, the Netherlands, France, Germany, the Scandinavian countries and Israel[1;3;4;8-13]. In Ukraine functions of the epidemiological «depository» belongs to the Ministry of Health of Ukraine Center for health statistics, which was created in 1992. The Center for health statistics exercises a statistical policy on main diseases of public interests, including the ulcer diseases and its complications (bleeding as well)[14].

The research on epidemiological features of the digestive diseases is challenging for healthcare givers concerning today trends on high specialized medical centers, like «diagnosis-related group», also its related to a treatment of gastrointestinal bleedings[15]. An exemplary kind of these centers presents the British structure called «dedicated gastrointestinal bleeding center»[16]. Similar centers have been developed widely in Ukraine.

The purpose of the study is to present epidemiological trends on the ulcer disease of the stomach or the duodenum in terms of the incidence, the prevalence and the rate of hospital admission episodes on ulcer bleedings; to identify interrelations between these indicators and changes in the resident population in Ukraine and Sumy region.

Materials and methods

Data sources and data collection

The information data were retrieved from the official national and the Sumy administrative agencies of statistics from 2009 to 2013[14;17-19]. The inclusion criteria were data from all in-patient state hospitals; data based on the diagnosis in accordance with the 10th revision of the International Statistical Classification of Diseases and Related Health Problems (ICD-10). The scheme of data extraction process is presented in the Diagram 1[20-33].

Diagram 1 Search of the population data on patients with ulcer disease of the stomach or the duodenum and the ulcer bleeding in Ukraine
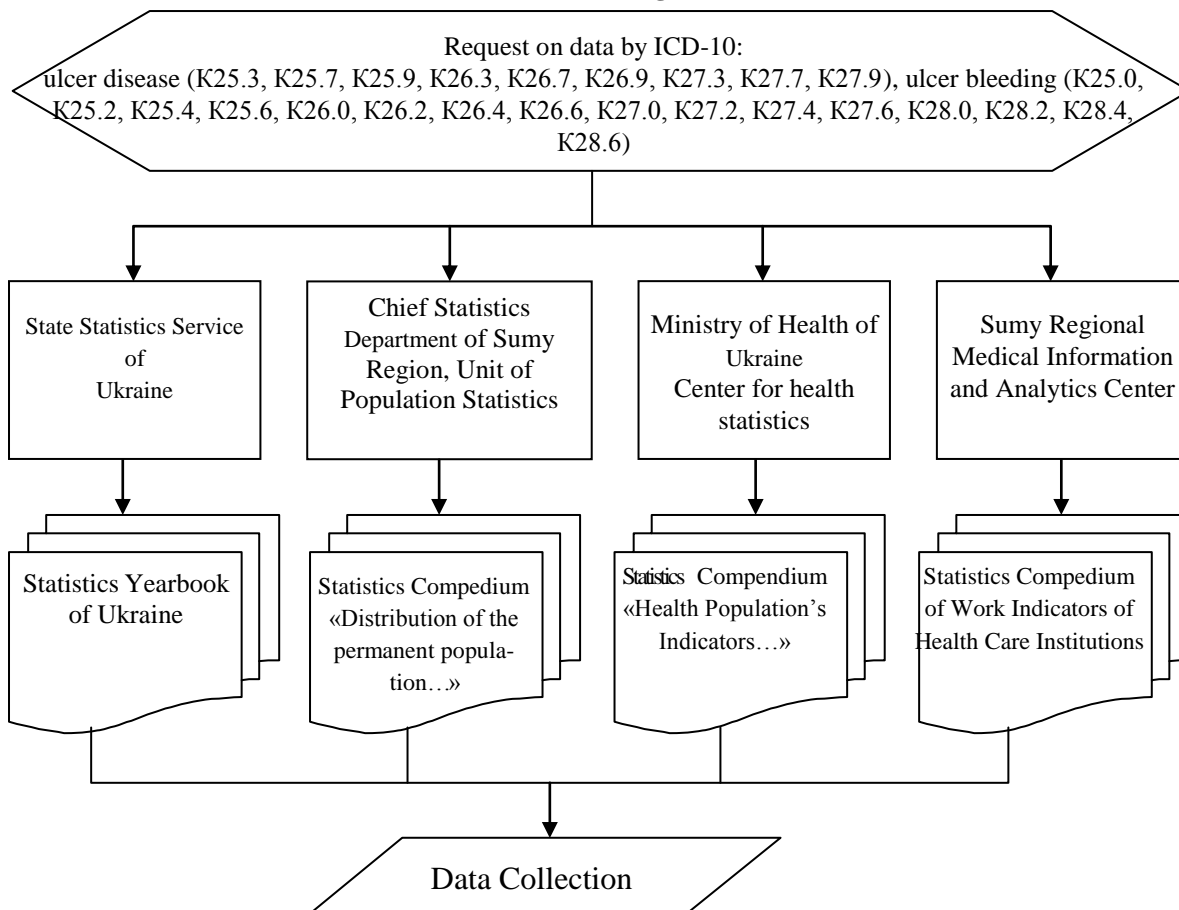
Statistical Analysis

The primary statistical processing of the information was performed with a help of Excel-2003, Microsoft Office-XP. All information collections were in absolute units without any mathematical cancellations. The authors used parameters to calculate baseline growth of each selected indicators analyzing a time flow. To reach the study's purpose, the authors applied the following variable:

$$K_{i/1} = \frac{y_i}{y_1}, i = 2,3,...,n$$

where yi is a numerical value in a corresponding i-year, y1 is the value of this indicator in the year accepted as a zero time year[34]. In the study a zero time year was 2009. The study considered statistical associations between the indicators, where the data were not restricted by the normal distribution law, so Spearman rank correlation (ρ) and linear Bravais-Pearson correlation(r) were used. This approach of the statistical analysis was due to a small volume of the observation sample and it was not possible to implement a correct check of the data for any compliance with the normal distribution law. The threshold was p<0,05 for statistical significance level, two-sided. The identification of correlation coefficients made with a statistical pocket, Statgraphics Centurion XVI.

Results and Interpretation

The united data is presented in Table 1, regarding the resident population, the incidence, the prevalence of the ulcer disease, and the hospital admission episodes of the ulcer bleedings.

Table 1

The parameters of the resident population, the prevalence and the incidence of the ulcer disease, the annual rate hospital admission episodes on ulcer bleedings

Year of observation	Resident population, inhabitants	Prevalence, patients	Incidence, patients	Annual rate of hospital admission episodes
Ukraine (absolute units, persons)				
2009	45 782 592	1 059 739	61 873	21 672
2010	45 598 179	1 052 741	58 293	21 261
2011	45 453 282	1 048 005	55 574	20 905
2012	45 372 692	1 032 667	54 538	21 911
2013	45 245 894	1 016 276	51 010	21 879
Baseline coefficients for Ukraine				
2009	1	1	1	1
2010	0,995972	0,9934	0,94214	0,98104
2011	0,9928	0,98893	0,89819	0,96461
2012	0,991	0,97445	0,88145	1,01103
2013	0,98827	0,95899	0,82443	1,00955
Sumy region (absolute units, persons)				
2009	1 170 125	31 416	1 836	852
2010	1 159 352	30 957	1 740	791
2011	1 150 141	30 899	1 748	678
2012	1 141 057	30 873	1 791	673
2013	1 130 765	30 794	1 805	684
Baseline coefficients for Sumy region				
2009	1	1	1	1
2010	0,9908	0,98539	0,94771	0,9284
2011	0,9829	0,98354	0,95207	0,79577
2012	0,97515	0,98272	0,97549	0,78991
2013	0,96636	0,9802	0,98312	0,80282

Table 1 demonstrates an annual decrease in the whole population in the country's level during five years it was observed. The resident population of Ukraine during the studied years decreased from 536 698 persons or 1,17% related to the initial meaning of 2009. The annual quantity of patients with a diagnosed acute or chronic uncomplicated ulcer of the stomach and the duodenum for the first time (the incidence) demonstrated the same trend, namely a decrease of the indicator from 61 873 to 51 010 persons, or from 0,13% to 0,11% of the resident population, respectively. Following this, the

prevalence for acute and chronic uncomplicated forms of the ulcer disease composed 1 059 739 persons or 2,31% of the resident population of Ukraine, but in 2013 the indicator was 1 016 276 persons, or 2,24%, respectively. So during the five-year period of observation the number of the prevalence lowered on 43 463 persons, or 1,03%.

Thus, the incidence and the prevalence for the ulcer disease has declined in our country during the five-year period, meanwhile the hospital admission episodes on bleedings brought other epidemiological trends. So, from 2009 to 2013 we observed a slight increase in episodes, namely from 21 672 to 21 879 registered in-patients or from 0,47‰ to 0,48‰ of the resident population, respectively. The same course had place in certain years: 2011-2012-2013.

From Table 1 it should be seen that in our region (Sumy) in the observed period the resident population reduced 39 360 persons in a total that presented 3,36% of the baseline of the resident population of the region. This was almost three-fold higher than in Ukraine.

During the five-year observation the prevalence, the incidence and the rate of admission episodes in the absolute numbers gave a decreasing trend, from 31 416 to 30 794 persons, from 1 836 to 1 805 persons, from 852 to 684 in-patients, respectively. However, after recalculation with percentage ratios related to the resident population, the regional prevalence and incidence increased from 2,68% to 2,72%, from 0,156% to 0,159%, respectively. Together with this, the rate on ulcer bleedings reduced from 0,7‰ to 0,6‰ (related to the resident population also).

We presented the obtained results of the prevalence and the incidence for the ulcer disease in the baseline coefficients of growth, also the rate of bleedings in Ukraine for the whole population and the regional subpopulation, on the example of the Sumy region (Graph 1 and 2).

Graph 1

Epidemiological trends of the incidence and the prevalence for the ulcer disease of the stomach or the duodenum and hospital admission episodes with the ulcer bleeding in Ukraine
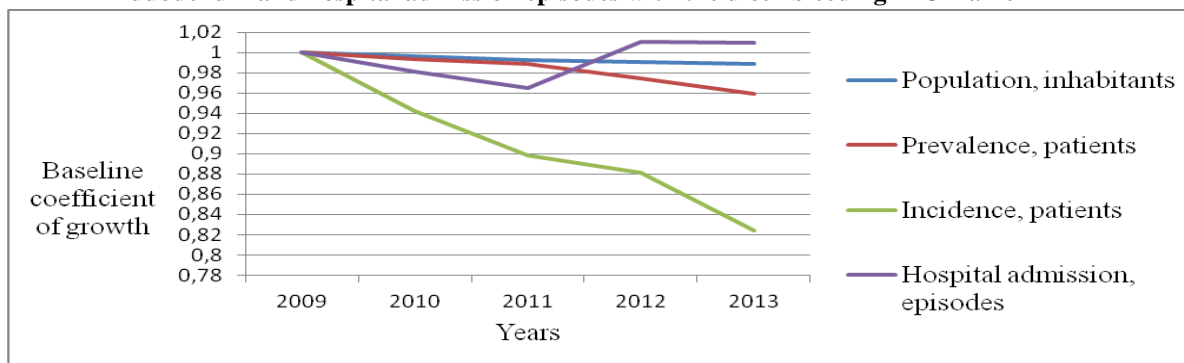
Graph 2

Epidemiological trends of the incidence and the prevalence for the ulcer disease of the stomach or the duodenum and hospital admission episodes with the ulcer bleeding in Sumy region
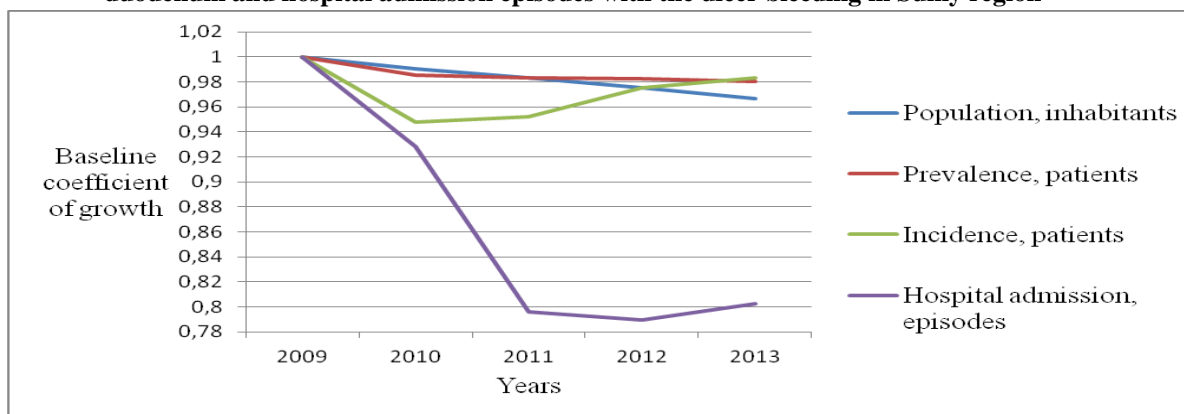
Including a constant recession of Ukraine's population from 2009 to 2013, it was calculated that the correlation link between the indicators was the following: the prevalence and the incidence correlated significantly (p=0,016, r=0,9433; p<0,0001, ρ=1); the prevalence and the population correlated significantly (p=0,02, r=0,9343; p<0,0001, ρ=1); the incidence and the population correlated significantly (p=0,0003, r=0,9957; p<0,0001, ρ=1). Notwithstanding this, a correlation between the prevalence and the rate of episode with bleedings was not significant(p=0,33, r=-0,5519; p=0,31, ρ=-0,5). Very weak correlations were between the incidence and the rate of bleedings were weak (p=0,67, r=-0,256; p=0,31, ρ=-0,5), between the rate of bleedings and the resident population of Ukraine (p=0,66, r=-0,263; p=0,31, ρ=-0,5).

The obtained results on Sumy region underlined a significant correlation under Bravais-Pearson between the rate of bleedings and the resident population (p=0,0482, r=0,8813; p=0,16, ρ=0,7). Also, a significant rank correlation detected in the prevalence with the resident population (p=0,058, r=0,86; p<0,001, ρ=1). In other comparisons the character of correlation did not reach the threshold significance, namely between the prevalence and the incidence (p=0,33, r=0,5554; p=1, ρ=0), between the prevalence and the rate of bleedings (p=0,05, r=0,8776; p=0,16, ρ=0,7), between the incidence and the resident population (p=0,91, r=0,0664; p=1, ρ=0).

Currently, the accounting and the reporting on the main clinic-epidemiological indicators remain sufficiently informative but a cohort of organizational and juridical restrictions should be considered because it twists or «pollutes» data. Among the polluters can be cited a process of difficult diagnostics with a «formal» coding by ICD-10 of the ulcer disease and its complications, a complete inaccessibility to statistics of the private hospital sector in Ukraine to Ministry of Health of Ukraine Center for health statistics and its branches, data lost or data «accumulation» as a result of inadequate registration of case histories.

From the juridical point the ICD-10 coding of the ulcer disease and bleedings does not play an ideal role because it stipulates a variety of codes to a practitioner, as a central deliver of objective information. The problem is undiagnosed endoscopically bleeding sources extremely difficult to verify in another way. To demarcate a «true» ulcer bleeding or to diagnose another disease as a bleeding source is often impossible. For these situations, the coding disposes a group of unspecific K92.2 (unspecified gastrointestinal bleeding), K29.0 (acute hemorrhagic gastritis), K92.0 (hematomesis), K92.1 (melena)[35]. In the present study it was not possible to define this epidemiological lost through the unspecific coding. In addition, according to the official reporting and definitions, diseases of operated stomach do not include in the ulcer disease's count, whereas bleedings of an operated stomach insert in calculation as the ulcer bleedings and, therefore, they become reportable[36].

Finally, the authors could not obtain objectively a lost in data through a pathway from hospitals to registration of Ministry of Health of Ukraine Center for health statistics and its regional units, so called «drop-out rate». The Swedish National Patient Register, as an experienced register in Europe, pays attention to 1% statistical lost from this effect. Moreover, this lost depends a lot from one regional unit to the another[37].

The obtained data from admissions on bleedings did not differ effects of recurrence of the ulcer bleeding. When the admission rate of bleedings calculated, per one unit was estimated one bleeding. From clinician's point one unit should represents one patient during the whole statistical year, but in fact, the official method of collection and reporting could not separate bleedings per patient. Regarding on these official methods of data collection, to differ multiple recurrent bleeders from first-time bleeder was not real.

Conclusion

1. The association between the decrease of the resident population of Ukraine and the national decreasing trends of the incidence and the prevalence for the ulcer disease is statistically significant(p<0,05).

2. An interrelation on the national level between the hospital admission rate for the ulcer bleeding and the decrease of the incidence and the preva- lence for the ulcer disease is not approved (p>0,05), even in condition of the decrease of the resident population of Ukraine. Moreover, it was observed the national trend of absolute and relative increases of the hospital admission rate for the ulcer bleeding even in the demographic recession. The rate increases from 21 672 persons to 21 879 persons.

3. On the population level, Sumy region do not show a significant interrelation(p>0,05) between the demographic recession and the decrease in the prevalence and the incidence for different forms of the ulcer disease, except a significant interrelation for the resident population and the prevalence (p=0,058, r=0,86; p<0,001, ρ=1).

4. Opposing Ukraine, Sumy region gives a significant association between the rate of ulcer bleedings and of the resident population of the region(p=0,0482, r=0,8813).

5. Despite the all-Ukrainian trend giving the rise in bleeding episodes, the other trend persists in

Sumy region concerning absolute and relative decrease of episodes of the ulcer bleedings, even against the background on relative increase of the prevalence for the ulcer disease, namely from 852 to 684 patients with bleeding.

Need for a future research.

A study of regional particularities in the ulcer disease in condition of a specialized regional gastrointestinal bleeding center should be required.

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