Humanity & Social Sciences Journal 9 (1): 22-29, 2014
ISSN 1818-4960
© IDOSI Publications, 2014
DOI: 10.5829/idosi.hssj.2014.9.1.1140

The Role of Social Health in the Formation of the Total Mortality Structure (Economic Aspect)

Yuliya Shmatova, Mikhail Morev and Alexandra Korolenko

FSFSI Institute of Socio-Economic,
Development of Territories of Russian Academy of Sciences

Abstract: The article presents the results of analysis of the socio-economic damage as a result of death of working population in the Vologda region in 2012 by calculating «Years of Potential Life Lost» Index. It is estimated the direct and indirect losses from the group causes «social health», namely social diseases (including mental illness, alcoholism and drug abuse), as well as homicides and suicides. It is determined the contribution of social health into the overall structure of mortality. Following results were obtained: 1. Total damage from "social ailment" comprises 55,8% of losses from mortality (22,5 bln roubles or 5,4% GRP of Vologda region in 2012) 2. The greatest losses are triggered by alcohol consumption and suicides (24% both). Moreover, indirect losses from alcohol that are not reflected in the statistics exceed direct ones by one third. Damage from latent suicides is 20% more than officially registered. 3. Two thirds of outer cause mortality damage and more then a half of circulatory diseases are caused by "social ailment".

Key words: Social health · Mortality · Able-bodied population · Social and economic losses · Demographic losses · Suicide · Murder · Aocially significant diseases · Latent suicides

INTRODUCTION

Social health, in a broad sense, reflects the ability of each member of society to adapt to his/her society, not just "surviving" in it, but realizing his/her potential, needs, achieving his/her goals and, thus, changing the social reality. Research into social health allows us to reveal the trends in the development of society, the level of people's adaptation to the existing conditions of life, the challenges and opportunities emerging in the realization of human potential in a particular society.

Health has its dialectical opposite, without which the research is meaningless. This opposite is disease. The term "social diseases" was used extensively in the Soviet literature. At present, the concept "socially important diseases"[1] (SID) is used. In our opinion, they are, undoubtedly, the indicators of social health according to their key features:

- Occurrence and (or) distribution of SID depends mainly on the socio-economic conditions.
- The main feature and, at the same time, the key problem of socially important diseases is their wide distribution.

[1]These include tuberculosis, sexually transmitted diseases (STDs), hepatitis B and C, HIV-infection, malignant neoplasms, diabetes mellitus, mental disorders and conduct disorders (including alcoholism and drug addiction), diseases characterized by high blood pressure. The official list of socially important diseases was approved by the RF Government Decree

Corresponding Author: Yuliya Shmatova, FSFSI Institute of Socio-Economic Development of Territories of Russian Academy of Sciences.

- Social significance of the diseases specified in the list stems from their negative impact on human capital, on human organism in general (including sexual and reproductive health) and on the country's socio-economic development [1].

Several authors consider various social anomalies and pathologies (alcoholism, drug addiction, especially among young people; criminalization; suicide, etc.) to be the manifestation of social disease. Their distribution is especially important for our country. One is also disturbed by the fact that these social pathologies are prevalent among the working-age population. High mortality in the economically active population causes the reduction of the region's human potential, the shortage of labor resources and, consequently, the impossibility of successful socio-economic development in the region. Therefore, the goal of this work is to estimate the economic losses due to mortality from the causes that characterize social health, namely:

- Socially important diseases (including alcoholism and drug addiction);
- Suicide;
- Homicide.

MATERIALS AND METHODS

One of the key indicators in calculating the cost of the socio-economic consequences of premature mortality is the value of the economic damage from the loss of a member of the society. We take the indicator "years of potential life lost" (YPLL), recommended by the WHO, as the unit of measurement. The standard for expressing the damage in monetary terms is in most cases either the average annual wage or per capita gross regional product (GRP) calculated on the basis of the number of population employed in the economy in a given year. The latter approach is more appropriate in the framework of our study, because it allows us to determine the amount of economic damage or lost profit for the region due to mortality in the working-age people, assuming that all of them are economically active.

RESULTS

General Structure of Mortality and Years of Potential Life Lost: Let us consider the structure of total mortality in the working-age population of the Vologda Oblast in 2012. A significant share (32.2%; Fig. 1) belongs to a group of deaths due to circulatory diseases. The leading role of this group in terms of its contribution to the total demographic losses is a global trend of modernity [2]. The second place in the Vologda Oblast belongs to the group of external causes (27.7%). Thus, together they account for 60% in the total structure of premature mortality. As for the structure of mortality in working-age women, the share of each group of these causes is 24% and it is smaller than that in men. However, when assessing the years of potential life lost, the contribution of external causes is 42.4% (23691 YPLL) of losses due to the total mortality (55862 YPLL) and the losses from circulatory diseases are much less (only 13555 YPLL or 24.3%).

The reason lies in the fact that mortality from accidents is prevalent mainly in the younger age in comparison with mortality from cardiovascular diseases. In terms of rubles, YPLL cause the region's budget losses that amount to almost 10 billion rubles due to mortality from circulatory diseases and 17 billion rubles due to mortality from external causes. As a percentage of GRP, it is 3% and 4.1%, respectively.

The third and fourth places in the structure of mortality in able-bodied residents of the Vologda Oblast are occupied by malignant neoplasms and diseases of the digestive system (6266 and 6689 YPLL or of 14.5 and 12.7% of total mortality, respectively; Fig. 1). Cancer accounts for 10.4% and diseases of the digestive system – 12% in the total losses.

Mortality from Social Health Deterioration: Let us consider in detail the demographic losses due to mortality from external causes in the Vologda Oblast in 2012, which belong to the "social health" category.

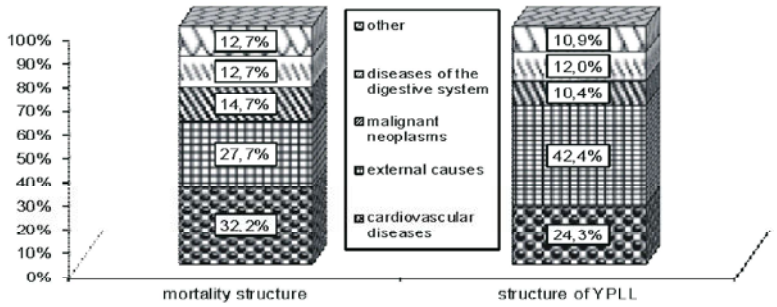

Fig. 1: Structure of mortality and years of potential life lost due to mortality arranged by groups of causes in the Vologda Oblast in 2012

Table 1: YPLL of the working-age population due to various causes of death in the Vologda Oblast in 2012

Cause of death	Cases	In % to total mortality	YPLL	In % to YPLL from mortality	Billion rub.	In % to GRP
Circulatory diseases	1549	32.0	13555	24.3	9.78	2.33
Diseases of the digestive system	607	12.7	6689	12.0	4.83	1.15
External causes, including:	1321	27.7	23691	42.4	17.1	4.07
Road accidents	179	3.7	4119	7.4	2.97	0.71
Homicides	104	2.2	2217	4.0	1.6	0.38
Suicides	177	3.7	3351	6.0	2.42	0.58
Hidden suicides*	244	5.1	4153	7.4	3.0	0.71
Alcohol-related diseases**	368	7.7	5109	9.1	3.69	0.88
Malignant neoplasms	691	14.5	6266	10.4	4.52	1.08
Tuberculosis	74	1.5	1207	2.2	0.87	0.21
Other socially important diseases***	48	1.0	549	0.98	0.40	0.09

*Hidden suicides include: accidental suffocation; other accidental poisoning; falling, jumping or pushed from height, undetermined intent; accidents caused by firearms-related injuries.

**We included the following causes of death in this group: alcoholic psychoses, degeneration of the nervous system caused by alcohol, alcoholic polyneuropathy, myopathy, cardiomyopathy, gastritis, liver disease, chronic pancreatitis of alcoholic etiology; fetal alcohol syndrome, alcohol poisoning.

***These include mental disorders not related to alcohol consumption, diabetes, STDs, HIV, hepatitis B and C.

Suicidal and criminal case mortality. Suicide, due to its wide distribution among working-age people, entails the most significant demographic (life expectancy decrease) and economic losses (increase in non-produced GRP due to years of potential life lost).

One hundred and seventy seven working-age people died from suicides in the region in 2012 (3.7% of the total mortality; Table 1), which resulted in the losses equal to 3351 years of potential life lost (6% of all the losses due to YPLL and 14% of the group of external causes). In monetary terms this figure is over 2.4 billion rubles, or 0.58% of GRP.

However, the suicide mortality rate registered by the official statistics does not reflect the actual situation. According to the approach proposed by UNICEF, we have identified a latent rate of suicide [3].

Mortality from these causes in the Vologda Oblast working-age population in 2012 was significantly higher than officially registered suicide rate (244 deaths; tab. 1). If hidden suicides amounted to 5.1% in the total mortality, then due to the total losses of YPLL equal to 7.4% (from external causes – 17.5%) the damage amounted to 3 billion rubles, or 0.71% of GRP.

Thus, the total socio-economic losses from actual and latent suicide are more than 5.4 billion rubles, which amounted to 1.3% of GRP in 2012.

Socio-economic damage due to homicides is 3 times less. In 2012 this cause of death amounted to 2.2% of the total mortality (Table 1) and the losses of YPLL were 4% of all the losses (9.4% of the losses due to external causes). The damage in monetary terms is 1.6 billion rubles or 0.4 % of GRP.

Alcohol-Related Mortality: The World Health Organization highlights smoking [4] and alcohol abuse as the major risk factors affecting the outcomes of the main groups of diseases, causing high rates of mortality, morbidity and disability. Alcohol consumption leads to the loss of 17 million disability-adjusted life years (DALY[2]), or 4.5% of the global burden of disease [2; 5]. About 6.5% of all deaths in Europe are related to alcohol consumption [4] (The European health report 2012, pp.46-47). According to Russian Federal Agency of Statistics, consumption of pure alcohol was 13.5 liters per Russian citizen in 2013. The world average is 6.2 liters of pure alcohol per year.

Therefore, let us consider the problem of alcoholism in more detail. Substance abuse disorders, in addition to their own direct harm, make a significant contribution to mortality from diseases of the organs of the circulatory and digestive systems. For example, according to various sources, from 40 to 80% of cases of liver cirrhosis are caused by chronic alcohol intoxication [6]; among the cases of chronic pancreatitis the proportion of those caused by alcohol consumption, is 40-75% [7, p.30].

The problem of alcoholism is especially acute in the Vologda Oblast. The number of people suffering from alcohol addiction and alcoholic psychosis, the volume of consumption of vodka and wine and mortality from accidental alcohol poisoning in the Vologda Oblast is higher than in Russia on average. The incidence of alcoholic psychosis in the region is 70% higher than the national average. The region ranks second after the Omsk Oblast by the amount of consumed beer (108.6 liters per year per capita).

In order to analyze socio-economic consequences of alcohol consumption, we considered the following causes of death: mental disorders (alcoholic psychoses), degeneration of the nervous system caused by alcohol, alcoholic polyneuropathy, myopathy, cardiomyopathy, gastritis, liver disease, chronic pancreatitis of alcoholic etiology; fetal alcohol syndrome, alcohol poisoning (accidental, intentional, undetermined intent). In 2012, in the Vologda Oblast 368 working-age people died due to these causes, which accounted for 7.7% of the total mortality. This group of causes of death is estimated at 5109 years of potential life lost (9% of all YPLL due to mortality; Table 1). The region lost 3.7 billion rubles, or 0.9% of GRP. More than 60% (3129 person-years) of YPLL due to mortality from alcohol consumption falls on urban residents, 88% (4500 person-years) – on men.

However, it is necessary to take into account other causes of death related to alcohol. According to A.V. Nemtsov, about 2/3 of deaths from accidents and violence are connected with alcohol [8]. About 80% of murderers are intoxicated when they commit murder. From 60 to 80% of suicides are in a state of alcoholic or narcotic intoxication. In addition, more than 60% of fatally injured in an accident die with a high concentration of alcohol in their blood [9]. According to the World Health Organization, drunk driving is a major risk factor in road traffic safety [10].

We can say with a high degree of probability that these deaths could have been avoided if it were not for the consumption of alcohol by those responsible for the deaths.

Thus, the indirect losses due to alcohol consumption in the Vologda Oblast can be expanded (according to A.V. Nemtsov) by 80% of homicides (1.28 billion rubles – 0.3% of GRP; table 2), 60% of road accidents (1.78 billion rubles – 0.43% of GRP) and 70% of suicides (1.7 billion rubles – 0.41% of GRP). As a result, we have the socio-economic loss due to the mortality indirectly caused by alcohol in the amount of 4.76 billion rubles, or 1.1% of GRP.

Taking into account the direct losses of YPLL due to alcohol consumption (3.7 billion rubles, or 0.9% of GRP), the total damage will amount to 8.46 billion rubles or 2% of GRP.

[2]The disability-adjusted life year (DALY) is a consolidated indicator that combines years of life lost due to premature death and years of life lost due to ill-health

Table 2: Structure of YPLL due to mortality from the causes characterizing social health in the Vologda Oblast in 2012

Cause of death	Types of losses	YPLL in 2012	Total losses	Billion rubles	Share of GRP
Diabetes	Direct	290	1699	1.23	0.29%
	Indirect	325 (stroke)			
		1374 (coronary heart disease)			
High blood pressure	Indirect	1036 (stroke)	3846	2.78	0.66%
		2810 (coronary heart disease)			
Alcohol	Direct	5109	7580*	5.47	1.3%
	Indirect	2471 (RTA)			
		1773 (homicide)			
		2346 (suicide)			
Suicide	Official	3351	7504	5.42	1.29%
	Latent	4153			
Cancer	Direct	6266	6266	4.52	1.08%
Tuberculosis	Direct	1207	1207	0.87	0.21%
Homicide	Direct	2217	2217	1.6	0.38%
STD, mental disorders, hepatitis B and C, HIV infection	Direct	549	549	0.61	0.14%
Social health	Direct	18989	31185	22.5	5.4%
	Indirect	12169			
Total mortality			55862	40.3	9.6%

*Total direct losses from mortality due to alcohol and indirect losses from an accident under the influence of alcohol, not including the contribution of alcohol in mortality from homicides and suicides, as they are considered in the other columns of this table.

Table 3: Frequency of depression and anxiety in somatic diseases

	Disorder frequency	
Disease	Depression	Anxiety
Cardiovascular disease [21]	18–60%	15–30%
Myocardial infarction [22]	42%	50%
Chronic obstructive pulmonary disease [23]	23–43%	37–54%
Rheumatoid arthritis [24]	38%	44%
Malignant neoplasms [25]	53%	27%
Chronic pancreatitis [20]	90%	No data

Socially Significant Disease Mortality: Diabetes mellitus also refers to the category of "socially important diseases". Mortality from diabetes in Russia and the Vologda Oblast is 2 times less than in Europe, according to the WHO data. It is alarming that diabetes morbidity has been steadily increasing, especially among children and adolescents (since 2000 by 30 and 40%, respectively). In the Vologda Oblast in 2012 twenty-one people of the working age died for this reason and the losses amounted to 290 YPLL (Table 2).

We have estimated indirect losses from diabetes, which is an important and widespread risk factor for diseases of the circulatory system. In addition to its direct role in diabetes mellitus, the increased level of sugar is a cause of 22% of the deaths from coronary heart disease and 16% of the deaths from stroke [11]. So, the 22% of the losses from coronary heart disease in the Vologda Oblast in 2012 amounted to 1374 YPLL and 16% from stroke – to 325 YPLL. So, the direct and indirect losses from diabetes totaled 1699 YPLL, or 1.23 billion rubles, i.e. 0.29% of GRP (Table 2).

The World Health Organization considers high blood pressure as the second most important risk factor for high mortality, morbidity and disability (after alcoholism and tobacco smoking) [12; 13]. According to the WHO various estimates, they result in 7.5 to 9.4 million deaths annually, i.e. approximately 12.8–16.5% of [14] the annual global mortality. This corresponds to 57 million DALY, or 3.7% of the total indicator [2, p.38].

In the Vologda Oblast in 2012 there were no registered deaths from this disease among the working age people. However, according to the WHO estimates, high blood pressure is a cause of 51% of deaths from stroke and 45% – from coronary heart disease [12]. On the basis of the Vologda statistics we have also estimated indirect losses from hypertension as a cause of death from stroke (51% of the loss from stroke amounts to 1036 YPLL) and coronary heart disease (45% = 2810 YPLL). The total is 3846 YPLL, i.e. 2.78 billion rubles, or 0.66% of GRP (Table 2).

In the Vologda Oblast in 2012 fifteen people of the working age died from various mental disorders. Only two of them did not have alcohol-related mental disorders. But, despite a slight loss of YPLL due to mortality from mental disorders, one should pay attention to its significant contribution to mortality from other diseases.

According to the WHO experts, the cause of 30% of all visits to general practitioners in European countries is mental health problems [15]. In 1927 D.D. Pletnev postulated the idea, undoubtedly critical even today. There are no somatic diseases without mental illnesses and vice versa [16]. According to many epidemiological studies, mental disorders are significantly more frequent among outpatients (by 1.5–2 times) and inpatients (by 1.5–3 times) of medical institutions than among the total population [17; 18], especially in cardiology and gastroenterology [19; 20]. The prevalence of depressive disorders among patients with CVD varies from 18 to 60%, anxiety disorders – from 15 to 30% or more (Table 3).

The presence of mental disorders among the patients with cardiovascular and gastrointestinal diseases does not only complicate the course and treatment of these disorders, but also reduces the patients' life expectancy.

CONCLUSIONS

Let us summarize the results. The total YPLL losses from mortality due to the causes related to the category of "social health" amounted to 31.2 thousand YPLL in 2012 (55.8% of the losses from total mortality; tab. 2), i.e. 22.5 billion rubles, or 5.4 % of GDP, which exceeded the losses due to other reasons. The direct losses amounted to 40%, while the indirect losses, hypothetically possible and unrecorded in the official statistics, were 60%. Undoubtedly, we cannot say that the latter reflects the consequences of social health entirely, but it certainly discloses that the extent of the problem is not evident from the first sight and requires consideration when assessing the damage to the regional economy.

In general, the structure of years of potential life lost from social disease in the Vologda Oblast in 2012 is as follows (Fig. 2). The leader is mortality from different causes of death that have the common etiology – alcohol. This group of causes comprises almost a quarter of all "social health price". The share of deaths from suicide and the reasons considered as "latent suicides" is almost equal. The fifth part of the damage is years of potential life lost due to oncological diseases. The socio-economic losses due to high blood pressure in the course of stroke and coronary heart disease amount to 12.5% of the damage from "social disease". This is followed by the deaths from homicide, diabetes and tuberculosis.

The leader is mortality from circulatory system diseases (they accounted to 13.5 thousand years of potential life lost in the Vologda Oblast in 2012). However, according to our calculations, more than half (7192 YPLL) of them are caused by "social disease" (Table 4). They include the damage due to the direct losses from alcoholic cardiomyopathy (1620), as well as indirect losses: diabetes (1726) and high blood pressure (3846).

The external causes of death inflicted the greatest damage (23.7 thousand YPLL) to the Vologda Oblast in 2012. However, among this group of causes two-thirds (62% or 14.7 thousand YPLL) referred to the diseases reflecting social health (Table 4).

Thus, we can conclude that the deterioration of social health causes significant damage to the region's economy due to mortality of the economically active population. The overwhelming proportion of deaths from social disease is preventable; it demands urgent measures to address this problem.

It should be noted that the research should be continued. So, we do not take into account the losses due to temporary, steady or partial disability of people suffering from the studied diseases, as well as the expenditure on medical and social support for these categories of people, which can significantly increase "social health price". Some negative impact of the studied CVD has not been evaluated. For example, almost zero mortality from STD is "compensated" by complications,

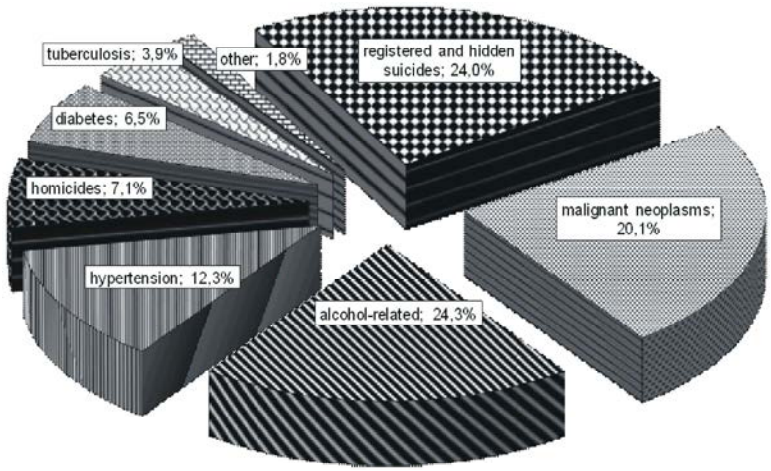

Fig. 2: Structure of the socio-economic damage (YPLL) from social disease due to mortality in the Vologda Oblast in 2012

Table 4: Contribution of social disease to mortality from cardiovascular diseases and external causes in the Vologda Oblast in 2012 (in % to the YPLL losses of each group of death causes)

Mortality from cardiovascular diseases		Mortality from external causes	
Diabetes	12.5%	Suicide	14.1%
High blood pressure	28.4%	Latent suicide	17.5%
		Homicide	9.4%
Alcoholic cardiomyopathy	11.9%	Alcoholic intoxication	10.6%
		Accident under the influence of alcohol	10.4%
Total social health	52.8%	Total social health	62.0%

which involve the deterioration of reproductive health in women and men (they are the main preventable cause of infertility, particularly among women), severe congenital diseases among children and visceral injuries. Excessive alcohol consumption results in the growth of some types of cancer, the crime spread, family disruption, disability, deterioration of the gene pool of the population, reduction of life quality of the patients and their families. Therefore, the problem of social health requires special attention from the government both at federal and regional levels.

REFERENCES

1. Comments to the Resolution of the Government of the Russian, 2004, No.715 “On approval of the list of socially important diseases and the list of diseases that pose a danger to others”. Rossiiskaya gazeta, December 07.
2. Mendis, S., *at al*., 2013. Global atlas on cardiovascular disease prevention and control. World Health Organization.
3. Ivanova, A.E. and T.P. Sabgaida, 2011. Adolescent Deaths from Suicide in Russia. United Nations Children’s Fund (UNICEF).
4. The European health report of 2012: charting the way to well-being, 2012. World Health Organization.
5. Global health risks: mortality and burden of disease attributable to selected major risks, 2009. World Health Organization.
6. Khazanov, A.I., 2005. Possibilities for development of alcoholic and nonalcoholic steatohepatitis in cirrhosis. Russian Journal of Gastroenterology, Hepatology, Coloproctology, 2: 26-32.
7. Serebrova, S. Yu, 2008. Chronic pancreatitis: modern approach to diagnosis and treatment Russian journal of medicine. Diseases of the Digestive System, 10(1): 30.

8. Nemtsov, A.V. and A.T. Terekhin, 2007. Extent and diagnostic composition of alcohol mortality in Russia. Narcology, 12: 29-36.
9. Alcohol abuse in Russia: socio-economic consequences and countermeasures. The report was approved by the Council of the Public Chamber of the Russian Federation on May 13, 2009. http://www.oprf.ru/files/dokladalko.pdf.
10. Global status report on road safety 2013: supporting a decade of action, 2013. World Health Organization.
11. World Health Statistics, 2012, 2013. A snapshot of global health. World Health Organization.
12. Global health risks: Mortality and burden of disease attributable to selected major risks, 2009. World Health Organization.
13. Global status report on noncommunicable diseases 2010, 2010. World Health Organization.
14. Lim, S.S., *et al*., 2012. A comparative risk assessment of burden of disease and injury attributable to 67 risk factors and risk factor clusters in 21 regions, 1990-2010: a systematic analysis for the Global Burden of Disease Study, 2010. Lancet, 380(9859): 2224-2260.
15. Mental health in the WHO European region: facts and figures, 2003. WHO
16. Pletnev, D.D., 1927. To the issue of somatic cyclothymia. Russian Clinic, 7(36): 495-500.
17. Belyalov, F.I., 2007. Psychosomatic connections in case of diseases of internal organs. Clinical medicine, 6: 19-21.
18. Rincon, H.G., *et al*., 2001. Prevalence, detection and treatment of anxiety, depression and delirium in the adult critical care unit. Psychosomatics, 42: 391-396.
19. Gromova, E.A., 2012. Psychosocial risk factors of cardiovascular disease (review of scientific works). Siberian Journal of Medicine, 27(2): 22-28.
20. Palii, I.G., I.G. Reznichenko and N.M. Sevak, 2007. Psychosomatic disorders in gastroenterology practice: clinical specifics and medical therapy. News of Medicine and Pharmacology, 6(210).
21. Garganeeva, N.P., 2013. Pletnev about mental symptoms in the case of purely somatic diseases: lessons of history and modernity. Kardiosomatika, 02: 5-11.
22. Burg, M.M. and D. Abrams, 2001. Depression in chronic medical illness: The case of coronary heart disease. Journal of Clin. Psychol, 57(11): 1323-1337.
23. Gudmundsson, G., *et al*., 2006. Depression, anxiety and health status after hospitalisation for COPD: A multicentre study in the Nordic countries. Respiratory Medicine, 100(1): 87-93.
24. Zyrianova, Y., *et al*., 2006. Depression and anxiety in rheumatoid arthritis: the role of perceived social support. Irish Journal of Medical Science, 175(2): 32-36.
25. Almanza, J., J.E. Downhill and D.M. Nierman, 2000. Psychiatric disorders in chronically critically patients in a respiratory care unit. Psychosomatics, 41: 157-190.