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Original article

Epidemiological Aspects of Suicide in the East Kazakhstan Region

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Abstract

Objective: *To study the trends of mortality from intentional self-harm in the East Kazakhstan region.*

Methods*. The main sources of information were the materials of the state registration of the deceased as a whole from intentional self–harm (ICD 10 - X60-84) for 2004-2013. Materials related to the East Kazakhstan region were analyzed. A retrospective study using descriptive and analytical methods of modern epidemiology was used as the main method in the study of mortality from intentional self-harm.*

Results. *In 2004-2013, 38,276 cases of intentional injuries were registered in Kazakhstan, of which only 5998 (15.7%) suicides occurred in the East Kazakhstan region. The average age of those who died from suicide was 40.4±0.5 years. The average annual crude mortality rates from intentional self–harm among both sexes amounted to 42.2±2.4 $^0/_{0000}$ (95%CI=37.5-47.0). In dynamics, the crude mortality rate for both sexes decreased, and the average annual rate of decline was T=–5.0%. Age-sex differences in suicide mortality rates were revealed. The analysis of age-related mortality rates from intentional self-harm in both sexes in the studied region showed a unimodal increase with a peak in the age group of 30-49 years.*

Conclusion*. The analysis of mortality from suicide showed that in the East Kazakhstan region, mortality is decreasing significantly. The data obtained make it possible to monitor trends and changes in suicide mortality. This helps to assess the effectiveness of measures to reduce the risk of suicide and adjust strategies and programs depending on changing conditions.*

Keywords: *suicides, age and gender characteristics, epidemiology, trends, East Kazakhstan region.*

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Introduction

Suicide is the voluntary termination of a person's life by causing fatal harm to himself [1]. Suicide is a global public health problem that causes a huge economic, social and psychological burden on individuals, families and communities. Suicides account for 1.4% of all deaths in the world, which means that more than 700.000 people die each year due to suicide [2]. Suicide can have various causes, such as depression, anxiety, mental disorders, drug addiction, physical illness or injury, social isolation and other factors. Suicide is a serious public health problem that requires multifaceted measures.

A number of variables are associated with suicide attempts, such as gender, place of residence, family integrity, a sense of meaninglessness of life, depression, bullying of a criminal, isolation of parents, low self-esteem, hopelessness and stressful life events [3]. Physical abuse in childhood, a family history of substance abuse, and criminal convictions among family members may also play a role in suicide attempts [4].

Suicides can be prevented. There are a number of measures that can be taken to prevent suicide and suicide attempts. WHO recommends the following key effective evidence-based interventions: restrict access to means of suicide; interact with the media for responsible coverage of suicides; educate adolescents in socio-emotional life skills; early detection, assessment, management and follow-up of anyone who is prone to suicidal behavior. Fundamental principles should be followed in all countries: situation analysis, multisectoral cooperation, awareness-raising, capacity-building, financing, monitoring and evaluation [5].

Kazakhstan belongs to the regions with an average suicide rate [6]. In Kazakhstan, there is a stereotype that mental health problems can be solved independently or with the help of folk remedies, which can hinder timely access to medical care and increase the risk of suicide [7]. Therefore, the study of suicide can help to form a broader understanding of mental health and manifestations associated with mental disorders in our country. It can also help to remove the stigma around mental illness and facilitate access to mental health services for people who need them.

Materials and methods

The main sources of information were the materials of the state registration of the deceased as a whole from intentional self-harm (ICD - X60-84). This study uses data from Ministry of Health of the Republic of Kazakhstan for 2004-2013. Materials related to the East Kazakhstan region were analyzed [8].

A retrospective study using descriptive and analytical methods of modern epidemiology was used as the main method in the study of mortality from intentional self-harm [9]. The extensive, crude and age-specific indicators are determined according to the generally accepted methodology used in sanitary statistics. The annual averages (M, P), mean error (m), 95% confidence interval (95% CI), and average annual upward/downward rates (T, %) were calculated. We did not justify the main calculation formulas in paper, since they are detailed in the textbooks on statistics [10,11]. Trends were determined using the least squares method, and the average annual growth rates were calculated using the geometric mean. Mortality rates are calculated per 100.000 of the total male and female population ($^0/_{0000}$). The following abbreviations are used in the tables: AN – absolute number, AA – average age, CI – crude indicator, SI – standardized indicator.

Results

In 2004-2013, 38.276 cases of intentional injuries were registered in Kazakhstan, of which only 5998 (15.7%) suicides occurred in the East Kazakhstan region. Of these, 4.983 were men and 1.015 were women. The distribution of the deceased by age groups showed that in the study region the largest proportion of suicides was found in the age groups of 15-29 years and 30-49 years (Table 1).

The average age of those who died from intentional injuries among the female population was 42.5±0.9 years and was statistically significantly (p=0.011) higher than the same indicator in the male population – 39.9±0.5 years. In general, the average age of those who died from suicide was 40.4±0.5 years in the region (Table 1).

Table 1 - Distribution of deaths from intentional self-harm by age groups in East Kazakhstan region for 2004-2013

Age groups, years	Both sexes		Men		Women	
	AN	%	AN	%	AN	%
up to 14	79	1.3	62	1.2	17	1.7
15-29	1876	31.3	1552	31.1	324	31.9
30-49	2448	40.8	2114	42.4	334	32.9
50-64	1054	17.6	875	17.6	179	17.6
65+	541	9.0	380	7.6	161	15.9
Total	5998	100.0	4983	100.0	1015	100.0
AA (M±m), 95% CI	40.4±0.5		39.9±0.5		42.5±0.9	
	39.4-41.3		38.9-40.9		40.8-44.2	

In dynamics, the average age of those who died from intentional self-harm in East Kazakhstan region is growing slightly. The average annual growth rate of the leveled indicator was T=+0.8% (R2=0.4991). However, there were differences in gender. In men, the indicator was T=+0.9% (R2=0.5075), and in women T=+0.5% (R2=0.0705), respectively (Figure 1).

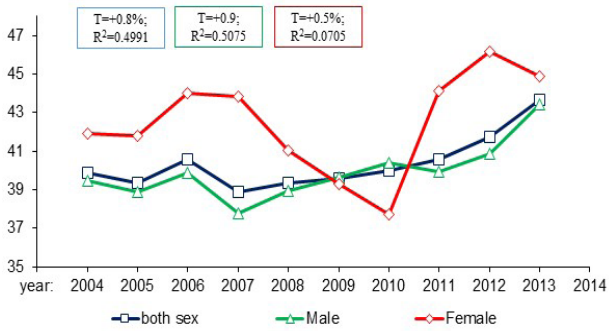

Figure 1 – Dynamics of the average age of those who died from intentional self-harm among the population of East Kazakhstan region by sex in 2004-2013

The average annual crude mortality rates from intentional self–harm among the both sexes amounted to 42.2±2.4$^0/_{0000}$ (95% CI=37.5-47.0), among the male population – 73.9±4.1$^0/_{0000}$ (95%CI=65.8-82.0) and among the female population 13.6±1.0$^0/_{0000}$ (95% CI=11.7-15.6). Mortality rates among men were almost five times higher than among women. In order to unify the results obtained in the studied region, as well as to eliminate the influence of age differences, we calculated standardized indicators (Table 2).

Table 2 – Average annual mortality rates from intentional self-harm in East Kazakhstan region for 2004-2013

Sex	Indicator	P±m, $^0/_{0000}$	95% CI, $^0/_{0000}$	T, %	R^2
male	CR	73.9±4.1	65.8-82.0	−5.0	0.8234
	SR	69.6±4.0	61.7-77.5	−5.2	0.8529
female	CR	13.6±1.0	11.7-15.6	−5.2	0.5212
	SR	12.5±0.9	10.7-14.3	−5.0	0.4872
both	CR	42.2±2.4	37.5-47.0	−5.0	0.7931
	SR	39.4±2.3	34.8-44.0	−5.3	0.8060

The results of calculating standardized mortality rates from intentional self-harm are shown in Table 2, while it was found that the standardized indicators were lower than the crude indicator, and the differences were not statistically significant.

In dynamics, the crude mortality rate for both sexes decreased from 48.9±1.8$^0/_{0000}$ (95% CI=45.3-52.5) in 2004 to 31.1±1.5$^0/_{0000}$ (95% CI=28.2-34.1) in 2013 (Figure 2). When this indicator is leveled, the downward trend is confirmed, and the average annual rate of decline was T=−5.0%.

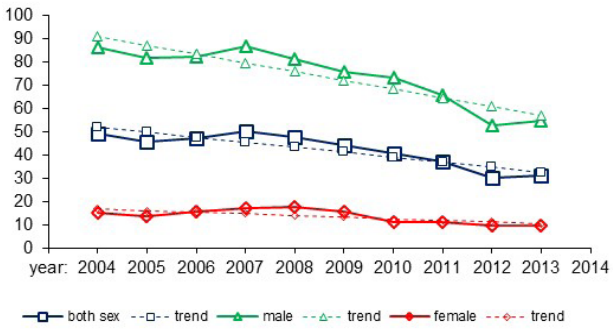

Figure 2 – Dynamics of the crude mortality rate from intentional self-harm among the population of East Kazakhstan region by sex for 2004-2013

Among the male and female population, the crude indicators also tended to decrease T=−5.0% and T=−5.2%, respectively (Figure 2). At the same time, the approximation level was closer to 1 in men.

The analysis of age-related mortality rates from intentional self-harm in both sexes in the studied region showed a unimodal increase with a peak in the age group of 30-49 years – 59.7$^0/_{0000}$ (Figure 3). This pattern was also found in the male population, the peak mortality was in the age group of 30-49 years (106.7$^0/_{0000}$). However, a bimodal increase in mortality was found in women and peaks were found at the age of 15-29 years (17.8 $^0/_{0000}$) and 65+ years (17.4 $^0/_{0000}$).

Analysis of trends in age-related mortality rates from intentional self-harm in East Kazakhstan region showed a downward trend in all age groups (Table 3). The highest rate of decline in both sexes was found in the age group under 15 years (T=−9.2%), and the lowest at the age of 65+ years (T=−3.9%). Almost the same trend was found among the male population.

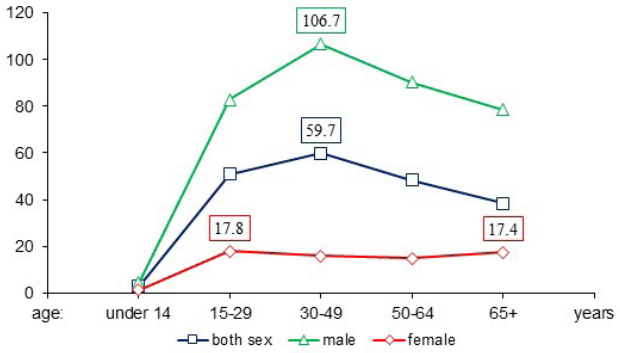

Figure 3 – Average annual age-related mortality rates from intentional self-harm in the population of East Kazakhstan region by sex for 2004-2013

However, a completely different situation was found among the female population. There was a slight decrease in mortality in the under -15 age group (T=−0.9%). And the highest rate of decline was found in the age group of 50-64 years (T=−6.4%).

Trends in age indicators have influenced the overall trend of mortality and the formation of average annual mortality rates from suicide.

Table 3 – Average annual growth/loss rates of the equalized age-related mortality rates from intentional self-harm in East Kazakhstan region for 2004-2013

Age	Both sex	Male	Female
Under 15	−9.2	−11.7	−0.9
15-29	−6.0	−6.2	−5.1
30-49	−4.7	−4.6	−5.4
50-64	−4.7	−4.4	−6.4
65+	−3.9	−3.9	−3.6

Discussion

Suicides occur all over the world, affecting people of all nations, cultures, religions, genders and classes. The current statistics of child suicides are striking and frightening at the same time [12]. It is reported that suicide is the second leading cause of death of children and young people aged 15 to 24 years [13]. In our study, we found that more than 30 percent of all suicide cases occur in the age group of 15-29 years. And also, among the female sex, the first peak of suicide mortality occurs at this age.

Teenage men commit suicide three times more often than girls [14]. However, in the East Kazakhstan region, we found that there are five times more suicides among men than among women. Both thoughts of suicide and attempts to commit it are more common in children with gender identity problems. Suicide cases are more common in men, while thoughts and suicide attempts are more common in women [15]. In the East Kazakhstan region, during the study period, suicide among boys under 15 years of age is greatly reduced. However, among girls at this age, the rate of decline was insignificant. Suicide mortality among adolescents can be prevented by overcoming risk factors such as bullying [16], victimization [16], substance abuse [17] and sexual activity [18]. Since suicide is often a complex interaction of psychological, social, biological, cultural and environmental factors [19,20], it is very important to identify risk factors associated with various aspects of a teenager's life.

Age-related suicide rates show that the suicide rate increases with age. But reaching a peak in 30-49 years, mortality decreases. But among the female sex, mortality at the age of 65+ years is gaining a second peak. With age, the rate of decline in mortality from suicide in men decreases. And in women, on the contrary, with age, the rate of decline only increases, except for the age group of 65+ years. Globally, the actual number of deaths due to suicide in old age is expected to increase as the proportion of older people increases [21]. The accumulation of physical illnesses, disabilities, life events and losses is considered as an explanation for the so-called rational suicide in order to abandon this final stage of life [22].

Other congenital factors, such as mental disorders and birth abnormalities, can increase someone's tendency to depression, whether it's an accidental episode or a lifelong illness. To reduce suicide mortality, countries need to eliminate many common underlying factors that add up to increase the likelihood that someone will choose suicide as a way out. The level of depression is one of the factors that is of serious importance, but other factors that should be considered include academic performance, physical condition, mental health and well-being, economic situation, financial difficulties, workplace productivity and overall life satisfaction [5].

In order to reduce the number of suicidal attempts, it is very useful to promote a healthy lifestyle, treat mental illnesses and establish strong relationships with family and social communities [23]. These steps should be taken from a sociocultural point of view, including removing obstacles to psychiatric care and rehabilitation of drug addicts, reducing the impact of the media on suicidal behavior and the influence of those who committed suicide [24].

Conclusion

The analysis of mortality from suicide showed that in the East Kazakhstan region, mortality is decreasing significantly. Mortality rates had age-sex characteristics. Thus, mortality rates among men were several times higher

than among women. Mortality among children under 15 years of age is very much reduced only among boys. The data obtained make it possible to monitor trends and changes in suicide mortality. This helps to assess the effectiveness of measures to reduce the risk of suicide and adjust strategies and programs depending on changing conditions.

Conflict of interest. The authors declare no conflict of interest.

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Contribution of the authors. ZhT, GK – Collection and preparation of data, primary processing of the material and their verification. GK, SO – Statistical processing and analysis of the material, writing the text of the article (material and methods, results). ZhA, ZK – Writing the text of the article (introduction, discussion). ZB, NI – Concept, design and control of the research, approval of the final version of the article. All authors approved the final version of the manuscript.

All authors have read, agreed with the final version of the manuscript and signed the copyright transfer form.

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Шығыс Қазақстан облысындағы суицидтің эпидемиологиялық аспектілері

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Түйіндеме

Зерттеудің мақсаты: Шығыс Қазақстан облысындағы қасақана өзіне-өзі зиян келтіруден болатын өлім-жітім үрдістерін зерделеу.

Әдістері. Ақпараттың негізгі көздері 2004-2013 жылдардағы қасақана өзіне – өзі зиян келтіруден қайтыс болғандар туралы мемлекеттік тіркеу материалдары (АХЖ 10 - Х60-84) болды. Шығыс Қазақстан облысына қатысты материалдар талданды. Әдейі өзіне-өзі зиян келтіруден болатын өлім-жітімді зерттеудің негізгі әдісі ретінде қазіргі эпидемиологияның дескриптивті және аналитикалық әдістерін қолдана отырып, ретроспективті зерттеу қолданылды.

Нәтижесі. 2004-2013 жылдары Қазақстанда 38 276 суицид оқиғасы тіркелді, оның тек 5998-і (15,7%) Шығыс Қазақстан облысында орын алды. Суицидтен қайтыс болғандардың орташа жасы 40,4±0,5 жасты құрады. Екі жыныстағы суицидтен болатын өлім-жітімнің орташа жылдық көрсеткіші 42,2±2,4$^{0}/_{0000}$ құрады (95%СА=37,5-47,0). Динамикада екі жыныстағы өлім-жітімнің жалпы деңгейі төмендеді және орташа жылдық төмендеу қарқыны Т=–5,0% болды. Суицидтен болатын өлім-жітім көрсеткіштерінде жас-жыныстық айырмашылықтар анықталды. Зерттелетін аймақтағы екі жыныстағы суицидтен болатын өлім-жітімнің жас көрсеткіштерін талдау 30-49 жас аралығындағы шыңы бар унимодальды өсуді көрсетті.

Қорытынды. Өз-өзіне қол жұмсаудан болатын өлім-жітімді талдау Шығыс Қазақстан облысында өлім-жітім айтарлықтай төмендегенін көрсетті. Нәтижелер суицидтен болатын өлімінің тенденциялары мен өзгерістерін бақылауға мүмкіндік береді. Бұл суицид қаупін азайту шараларының тиімділігін бағалауға және өзгеретін жағдайларға байланысты стратегиялар мен бағдарламаларды реттеуге көмектеседі.

Түйін сөздер: суицид, жас-жыныстық ерекшеліктері, эпидемиология, үрдістер, Шығыс Қазақстан облысы.

Эпидемиологические аспекты самоубийств в Восточно-Казахстанской области

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Резюме

Цель исследования: Изучить тенденции смертности от преднамеренных самоповреждений в Восточно-Казахстанской области.

Методы. Основными источниками информации были материалы государственной регистрации об умерших в целом от преднамеренных самоповреждений (МКБ 10 – Х60-84) за 2004-2013 гг. Были проанализированы материалы, относящиеся к Восточно-Казахстанской области. В качестве основного метода при изучении смертности от преднамеренного самоповреждения использовалось ретроспективное исследование с применением дескриптивных и аналитических методов современной эпидемиологии.

Результаты. В 2004-2013 годах в Казахстане было зарегистрировано 38 276 случаев самоубийств, из которых только 5998 (15,7%) произошли в Восточно-Казахстанской области. Средний возраст тех, кто умер в результате самоубийства, составил 40,4±0,5 года. Среднегодовой общий показатель смертности от самоубийств среди обоих полов составил 42,2±2,4$^{0}/_{0000}$ (95%ДИ=37,5-47,0). В динамике общий уровень смертности для обоих полов снизился, и среднегодовой темп снижения составил Т=–5,0%. Были выявлены возрастно-половые различия в показателях смертности от самоубийств. Анализ возрастных показателей смертности от самоубийств у обоих полов в исследуемом регионе показал унимодальный рост с пиком в возрастной группе 30-49 лет.

Выводы. Анализ смертности от самоубийств показал, что в Восточно-Казахстанской области смертность значительно снижается. Полученные данные позволяют отслеживать тенденции и изменения в смертности от самоубийств. Это помогает оценить эффективность мер по снижению риска самоубийств и скорректировать стратегии и программы в зависимости от изменяющихся условий.

Ключевые слова: суициды, возрастно-половые особенности, эпидемиология, тенденции, Восточно-Казахстанская область.