DOI: 10.31082/1728-452X-2019-202-4-2-7
УДК 616.366-003.7:616-006.6(574)

TRENDS OF GALLSTONE DISEASE INCIDENCE IN KAZAKHSTAN

NS IGISSINOV[1,2,3,4], https://orcid.org/0000-0002-2517-6315,
SK KOZHAKHMETOV[1,3], https://orcid.org/0000-0002-0075-0376,
DT TUREBAYEV[1], https://orcid.org/0000-0003-1557-3496,
KT ADAIBAYEV[1], https://orcid.org/0000-0002-9145-1661,
NA BIKHANOV[5], https://orcid.org/0000-0002-0890-4763,
ZA BILYALOVA[3], https://orcid.org/0000-0002-0066-235X

[1]Astana Medical University, Nur-Sultan c., Republic of Kazakhstan,
[2]International School of Medicine, Bishkek c., Republic of Kyrgyzstan,
[3]Central Asian Cancer Institute, Nur-Sultan c., Republic of Kazakhstan,
[4]Eurasian Institute for Cancer Research, Bishkek c., Republic of Kyrgyzstan,
[5]City Hospital № 1, Nur-Sultan c., Republic of Kazakhstan

Igissinov NS

Gallbladder diseases are usually displayed in the form of gallstones and gallbladder cancer. In order to identify the risk factors in population, epidemiological studies have to first determine the frequency of the disease.

Objective. To study trends of gallstone disease incidence in Kazakhstan.

Material and methods. The material of the study was the data of the consolidated reporting form No. 12 of the Ministry of Healthcare of the Republic of Kazakhstan on new cases of gallstone disease (ICD: K00-K99). We used data on the number of the studied population groups from the Statistical Committee of the Ministry of National Economy of the Republic of Kazakhstan. The study is retrospective for the period of 2006-2015. According to conventional methods of biomedical statistics, extensive, intensive and aligned incidence rates of Gallstone disease were calculated.

Results. The average annual incidence of gallstone disease among the entire population of Kazakhstan was 70.7±3.2$^0/_{0000}$ (95% CI=64.4-77.0), and among the studied population groups it was: among children – 10.9±1.7$^0/_{0000}$ (95% CI=7.5-14.2), among adolescents – 30.6±2,3$^0/_{0000}$ (95% CI=26.1-35.2) and among adults population – 94.8±4.9$^0/_{0000}$ (95% CI=85.1-104.4). Differences in incidence between groups were statistically significant. The trends in incidence rate had tendency of increase among the adult population (Tin=+4.6%), and tendency of decrease among children (Tdec=−9.4%) and adolescents (Tdec=−5.1%).

Conclusion. In dynamics, the incidence of bile stone disease in Kazakhstan as a whole tends to increase due to the adult population. The results are recommended to take into account the health organisations when making management decisions.

Keywords: gallstone disease, incidence, trends, Kazakhstan.

For reference: Igissinov NS, Kozhakhmetov SK, Turebayev DT, Adaibayev KT, Bikhanov NA, Bilyalova ZA. Trends of gallstone disease incidence in Kazakhstan. *Meditsina (Almaty) = Medicine (Almaty).* 2019;4 (202):2-7 (In Russ.). DOI: 10.31082/1728-452X-2019-202-4-2-7

Contacts: Nurbek S Igissinov, Doctor of Medical Sciences, Professor of the Department of Surgical Diseases and Internship "Medical University of Astana" JSC, Chairman of the PA «Central Asian Cancer Institute», Vice-President of the PA "Eurasian Cancer Institute", Astana c., 010000, Kazakhstan, Panfilov str. 7-25.
E-mail: n.igissinov@gmail.com

Контакты: Игисинов Нурбек Сагинбекович, д-р мед. наук, профессор кафедры хирургических болезней и интернатуры АО «Медицинский университет Астана», председатель ОО «Central Asian Cancer Institute», вице-президент ОО «Евразийский институт изучения рака», г. Астана, 010000, Казахстан, ул. Панфилова, 7-25.
E-mail: n.igissinov@gmail.com

Принято 20.04.2019

Т Ұ Ж Ы Р Ы М

ҚАЗАҚСТАНДАҒЫ ӨТ ТАС АУРУЫМЕН АУРУШАҢДЫҚ ТЕНДЕНЦИЯСЫ

Н.С. ИГИСИНОВ[1,2,3,4], https://orcid.org/0000-0002-2517-6315,
С.К. КОЖАХМЕТОВ[1,3], https://orcid.org/0000-0002-0075-0376,
Д.К. ТУРЕБАЕВ[1], https://orcid.org/0000-0003-1557-3496,
К.Т. АДАЙБАЕВ[1], https://orcid.org/0000-0002-9145-1661,
Н.А. БИХАНОВ[5], https://orcid.org/0000-0002-0890-4763,
З.А. БИЛЯЛОВА[3], https://orcid.org/0000-0002-0066-235X

[1]Астана медицина университеті, Нур-Султан қ., Қазақстан Республикасы,
[2]Халықаралық медицина жоғарғы мектебі, Бишкек қ., Қырғыз Республикасы,
[3]Central Asian Cancer Institute, Нур-Султан қ., Қазақстан Республикасы,
[4]Қатерлі ісікті зерттеу Еуразиялық институты, Бишкек қ., Қырғыз Республикасы,
[5]№1 қалалық аурухана, Нур-Султан қ., Қазақстан Республикасы

Өт қабының арулары өт қабындағы тастар және өт қабының обыры түрінде пайда болады. Популяциядағы қауіп-қатер факторын анықтау үшін, эпидемиологиялық зерттеулер әуелі ауру-шаңдық жиілігін анықтау керек.

Мақсаты. Қазақстандағы өт-тас ауруымен сырқаттанушылықтың үрдісін зерттеу.

Материал және әдістері. Зерттеу материалы Қазақстан Республикасы Денсаулық сақтау министрлігінің №12 есептілік формасынан ӨТА-ның жаңа оқиғалары туралы (ICD: K00-K99) туралы деректері алынды. Зерттелген топтардың саны туралы мәліметтер Қазақстан Респу-бликасы Ұлттық экономика министрлігінің Статистикалық комитетінен алынды. Бұл 2006-2015

жылдар аралғындағы ретроспективті зерттеу. Биомедициналық статистиканың жалпыға бірдей қабылданған әдістеріне сәйкес, ӨТА-мен аурушаңдықтың экстенсивті, интенсивті және деңгейлі көрсеткіштері есептелді.

Нәтижесі. ӨТА-мен аурушаңдықтың Қазақстандағы барлық халық арасындағы орта жылдық көрсеткіші 70,7±3,2$^0/_{0000}$ (95% СИ=64,4-77,0), ал халық арасындағы зерттеу тобында: балаларда – 10,9±1,7$^0/_{0000}$ (95% СИ=7,5-14,2), жасөспірімдерде – 30,6±2,3$^0/_{0000}$ (95% ДИ=26,1-35,2$^0/_{0000}$) және ересектерде – 94,8±4,9$^0/_{0000}$ (95% СИ=85,1-104,4$^0/_{0000}$). Топтар арасындағы аурушаңдық айырмашылығы статистикалық маңызды болды. Ересектер арасында аурушаңдықтың өсу үрдісі (Тө=+4,6%), ал балаларда (Тқ=−9,4%) және жасөспірімдерде (Тқ=−5,1%) төмендеу байқалды.

Қорытынды. Қазақстандағы өт-тас ауруымен сырқаттанушылық динамикада ересектер есебінен арту үрдісі байқалады. Денсаулық сақтау органдарына алынған нәтижелерді ескере отырып басқарушы шешімдерді қабылдау жөн.

Негізгі сөздер: өт-тас ауыруы, аурушаңдық, трендтер, Қазақстан.

Р Е З Ю М Е

ТЕНДЕНЦИЯ ЗАБОЛЕВАЕМОСТИ ЖЕЛЧНОКАМЕННОЙ БОЛЕЗНЬЮ В КАЗАХСТАНЕ

Н.С. ИГИСИНОВ[1,2,3,4], https://orcid.org/0000-0002-2517-6315,
С.К. КОЖАХМЕТОВ[1,3], https://orcid.org/0000-0002-0075-0376,
Д.К. ТУРЕБАЕВ[1], https://orcid.org/0000-0003-1557-3496,
К.Т. АДАЙБАЕВ[1], https://orcid.org/0000-0002-9145-1661,
Н.А. БИХАНОВ[5], https://orcid.org/0000-0002-0890-4763,
З.А. БИЛЯЛОВА[3], https://orcid.org/0000-0002-0066-235X

[1]Медицинский университет Астана, г. Нур-Султан, Республика Казахстан,
[2]Международная высшая школа медицины, г. Бишкек, Кыргызская Республика,
[3]Central Asian Cancer Institute, г. Нур-Султан, Республика Казахстан
[4]Евразийский институт изучения рака, г. Бишкек, Кыргызская Республика,
[5]Городская больница № 1, г. Нур-Султан, Республика Казахстан

Заболевания желчного пузыря обычно проявляются в виде камней в желчном пузыре и рака желчного пузыря. Чтобы определить факторы риска в популяции, эпидемиологические исследования должны сначала определить частоту заболевания.

Цель. Изучить тенденции заболеваемости желчнокаменной болезнью (ЖКБ) в Казахстане.

Материал и методы. Материалом исследования послужили данные сводной отчетной формы №12 Министерства здравоохранения Республики Казахстан о новых случаях ЖКБ (МКБ: К00-К99). Использованы данные о численности изучаемых групп населения Комитета статистики Министерства национальной экономики Республики Казахстан. Исследование ретроспективное за 2006-2015 гг. По общепринятым методам медико-биологической статистики вычислены экстенсивные, интенсивные и выравненные показатели заболеваемости ЖКБ.

Результаты. Среднегодовой показатель заболеваемости ЖКБ всего населения Казахстана был 70,7±3,2$^0/_{0000}$ (95% ДИ=64,4-77,0$^0/_{0000}$), а у изучаемых групп населения составил: у детей – 10,9±1,7$^0/_{0000}$ (95% ДИ=7,5-14,2$^0/_{0000}$), у подростков – 30,6±2,3$^0/_{0000}$ (95% ДИ=26,1-35,2$^0/_{0000}$) и у взрослого населения – 94,8±4,9$^0/_{0000}$ (95% ДИ=85,1-104,4$^0/_{0000}$). Различие в заболеваемости между группами было статистически значимым. Тренды заболеваемости имели тенденцию к росту у взрослого населения ($Т_{пр}$=+4,6%), а у детей ($Т_{уб}$=−9,4%) и подростков ($Т_{уб}$=−5,1%) к снижению.

Выводы. В динамике заболеваемость ЖКБ в Казахстане в целом имеет тенденцию к росту за счет взрослого населения. Полученные результаты рекомендуются учитывать органам здравоохранения при принятии управленческих решений.

Ключевые слова: желчнокаменная болезнь, заболеваемость, тренды, Казахстан.

Для цитирования: Игисинов Н.С., Кожахметов С.К., Туребаев Д.К., Адайбаев К.Т., Биханов Н.А., Билялова З.А. Тенденция заболеваемости желчнокаменной болезнью в Казахстане // Медицина (Алматы). – 2019. - №4(202). – С.2-7. DOI: 10.31082/1728-452X-2019-202-4-2-7

Gallstone disease or cholelithiasis is characterized by impaired cholesterol and bilirubin metabolism. It develops as a result of exposure to different factors with the formation of gallstones in gallbladder or bile ducts [1, 2]. Gallstone disease is normally identified at the stage when stones are formed [3]. Gallstone disease is a widespread worldwide and most often occurs in women [4]. Gallstone disease is a serious health problem in developed countries, which is affecting from 10 to 15% of the adult population [5]. For instance, about 25 million people suffer gallstones in the United States. Consequently, the cost of gallbladder disease in the United States is around $ 6.5 billion per year, and this is a serious burden for health [6].

In Russia, the frequency of gallstone disease ranges from 3 to 12% [7]. Many studies confirm that up to 72% of patients with gallstones disease symptoms have persistent gallbladder pain or complications, such as inflammation of the gallbladder; pancreatitis, intestinal obstruction with compaction of

gallstones, obstruction of the biliary tract, blockage of the bile ducts, emphysema of the gallbladder, severe form of cholecystitis, leading to disruption of the gallbladder wall; or perforation, rupture of the gallbladder [4, 5, 7, 8].

The purpose of this research is to study the dynamics of the incidence of gallstone disease in Kazakhstan.

MATERIAL AND METHODS

The study is retrospective (2006-2015). The source of the study was the materials of the state registration on patients with gallstone disease (ICD: K00-K99) who were diagnosed for the first time. We analyzed the consolidated reporting form No. 12 of the Ministry of Healthcare of the Republic of Kazakhstan and used the data of the Statistics Committee of the Ministry of National Economy of the Republic of Kazakhstan on the number of studied groups of the population [9].

According to conventional methods of biomedical statistics, extensive, intensive and aligned incidences rates of gallstone disease were calculated. We identified the average annual values (P), the average error (m), the 95% confidence interval (95% CI), and the average annual increase / decrease rate ($T_{in/dec}$, %) [10, 11]. The dynamics of incidence rates was studied for the period of 10 years, while the incidence trends were determined by the least squares method. We used the geometric mean to calculate the average annual rates of the dynamic range. The incidence rates for children in general (up to 15 years), adolescents (15-17 years), adults (18 years and over) and the total population are calculated for 100,000 ($^0/_{0000}$) of the relevant population.

The obtained materials were viewed and processed using a computer (Microsoft Office software package (Excel, Word); BIOSTAT and other statistical programs).

RESULTS

Some 115,817 new cases of gallstone disease were recorded in Kazakhstan in the studied period, of which 4,318 (3.7%) in children under 15 years old, 2,546 (2.2%) children and adolescents (15-17 years old) and adults (18 years and older) – 108,953 cases (94.1%).

The average annual incidence rate of gallstone disease among the entire population of Kazakhstan was 70.7±3.2$^0/_{0000}$ (95% CI=64.4-77.0). In dynamics, the incidence rate of gallstone disease had tendency to increase from 68.5±0.7$^0/_{0000}$ (95% CI=67.2-69.8) in 2006 to 87.9±0.7$^0/_{0000}$ (95% CI=86.5-89.3) in 2015, and the difference is statistically significant (t=19.6, p=0.00). The abovementioned tendency remains constant in aligning this rate, the average annual rate of increase was Tin=+3.7% (Figure 1).

The average annual incidence of gallstone disease in Kazakhstan differed among the studied population groups. The average annual incidence rate of gallstone disease among children was 10.9±1.7$^0/_{0000}$ (95% CI=7.5-14.2), among adolescents it was 30.6±2.3$^0/_{0000}$ (95% CI=26.1-35.2) and among the adult population – 94.8±4.9$^0/_{0000}$ (95% CI=85.1-104.4) (Figure 2).

Analysis of 95% CI incidence rate of gallstone disease in the studied populations showed that they did not overlap each other, i.e. the differences were statistically significant (t=6.89, p=0.00 when comparing children with adolescents, t=11.86, p=0.00 when comparing adolescents with adults and when comparing children with adults t=16.18, p=0.00).

In dynamics the gallstone disease incidence rate in the child population of Kazakhstan decreased from 22.8±0.8$^0/_{0000}$ (95% CI=21.2-24.3) in 2006 to 5.6±0.3$^0/_{0000}$ (95% CI=4.9-6.3$^0/_{0000}$) in 2015 which is statistically significant (t=20.13, p=0.00), and the average annual rate of decrease in the aligned rate was Tdec=−9.4% (Figure 3).

The incidence rate of gallstone disease in adolescents in Kazakhstan decreased from 42.8±2.1$^0/_{0000}$ (95% CI=38.7-47.0) in 2006 to 23.5±1.9$^0/_{0000}$ (95% CI=19.9-27.2) in 2015, and the difference was statistically significant (t=6.82, p=0.00). Aligning incidence rates gave the same result, and the average annual rate of decline was Tdec=−5.1% (Figure 4).

The incidence rate of gallstone disease increased among the adult population of Kazakhstan: from 86.7±0.9$^0/_{0000}$ (95% CI=84.9-88.5) in 2006 to 122.9±1,0$^0/_{0000}$ (95% CI=121.0-124.9) in 2015 and the difference in the indicated years is statistically significant (t=26.91, p=0.00). The average annual increase rate in alignment was Tin=+4.6% (Figure 5).

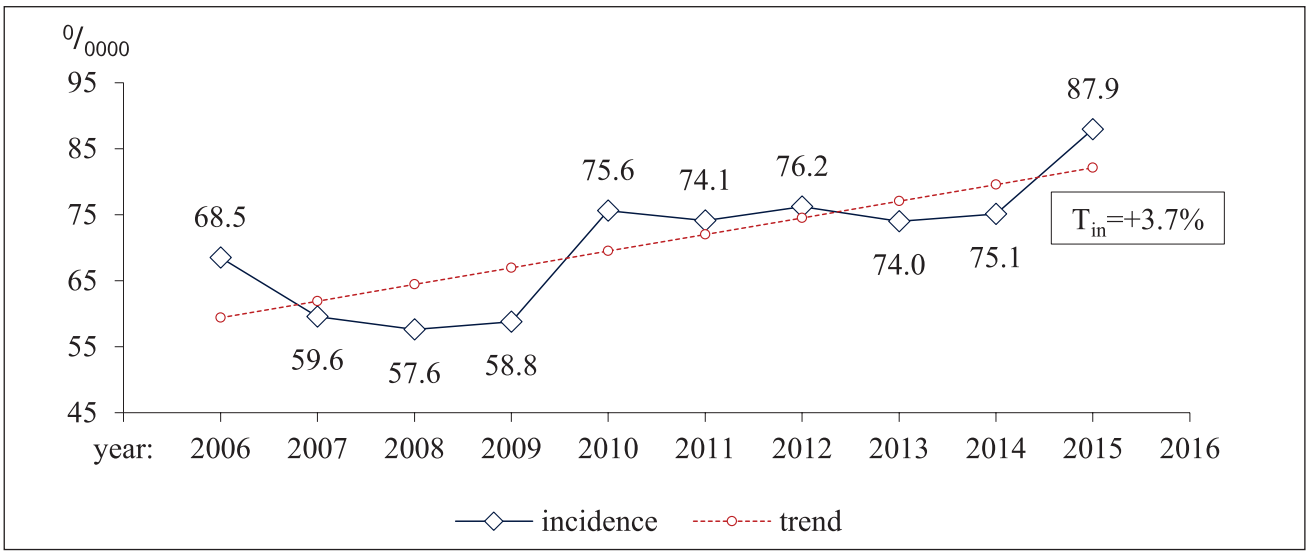

Figure 1 - The dynamics of the gallstone disease incidence rate among total population of Kazakhstan for 2006-2015

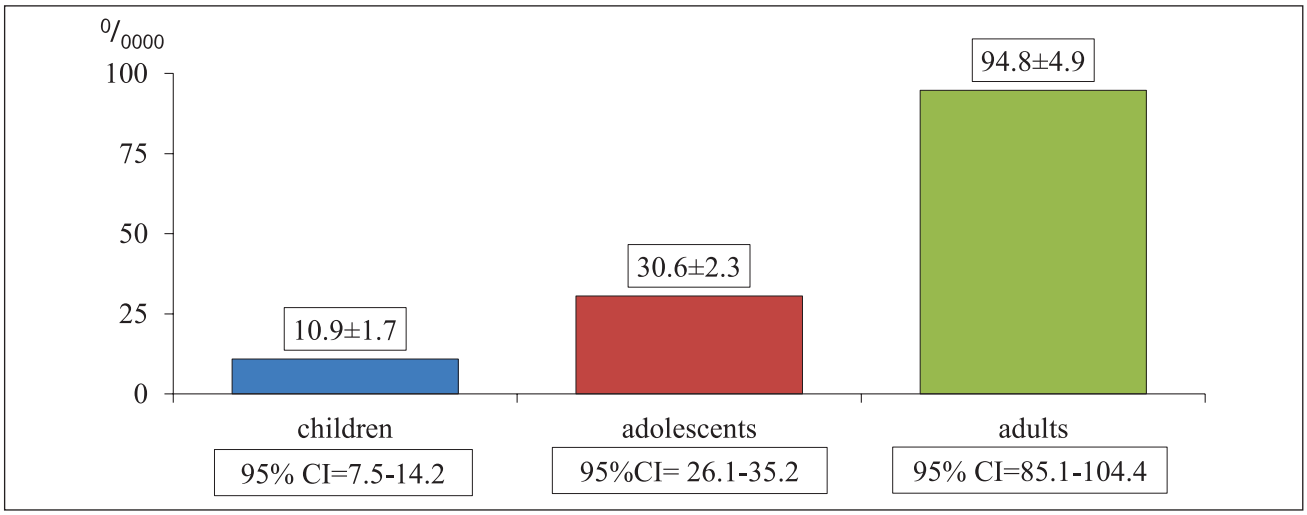

Figure 2 - The average annual incidence of Gallstone disease among the studied population groups in Kazakhstan for 2006-2015

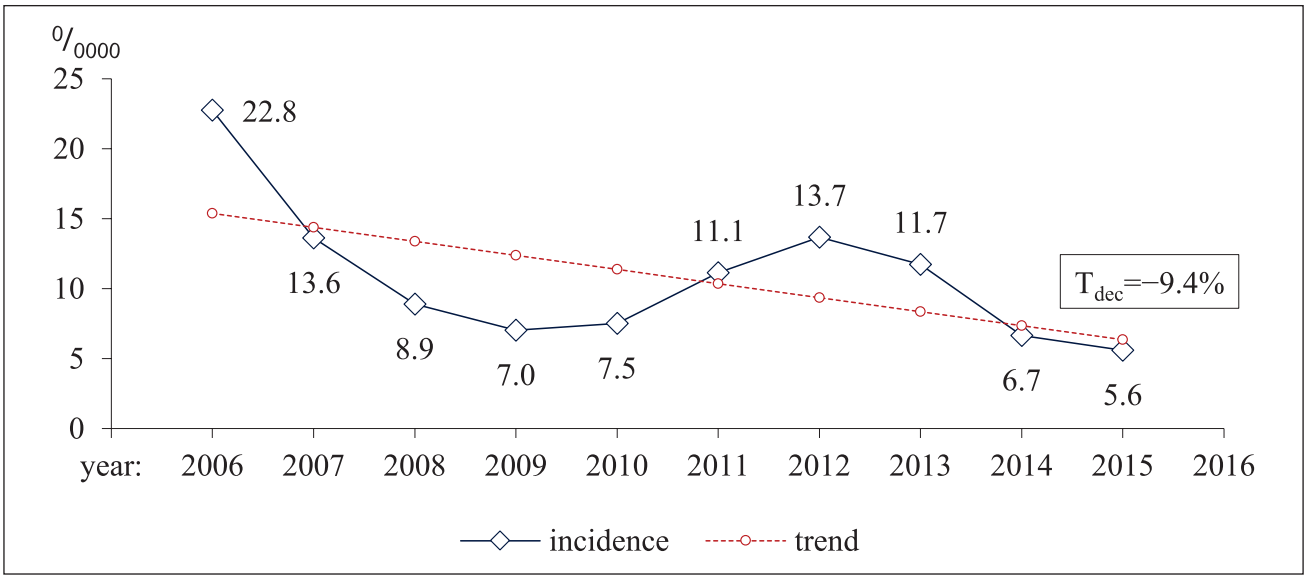

Figure 3 - The dynamics of the incidence of Gallstone disease among child population in Kazakhstan for 2006-2015

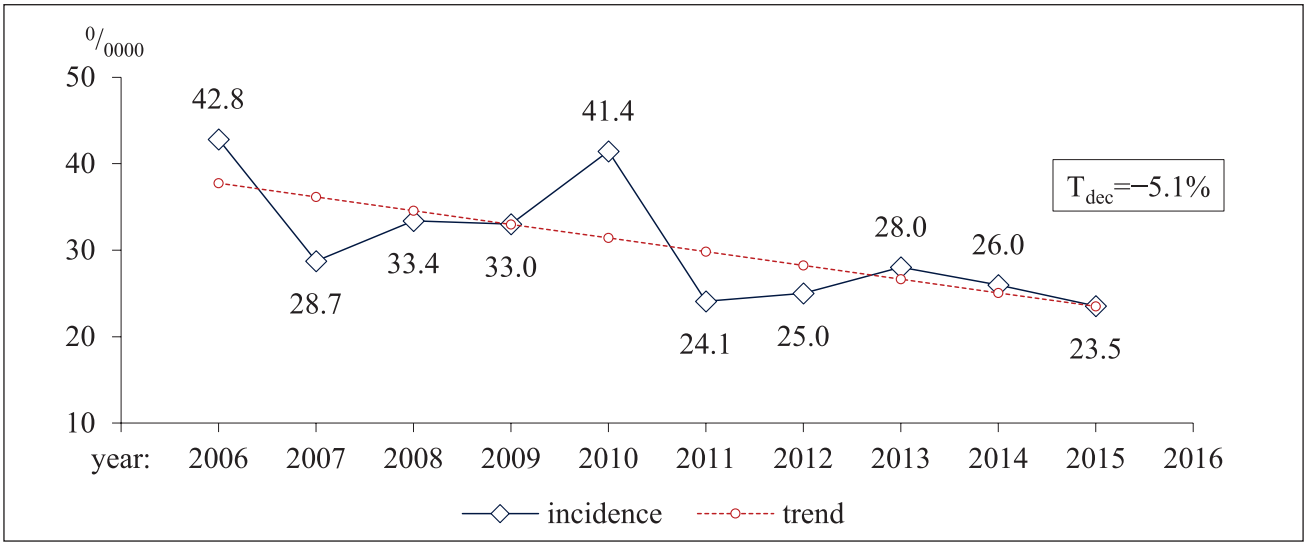

Figure 4 – The dynamics of the incidence of Gallstone disease among adolescent population in Kazakhstan for 2006-2015

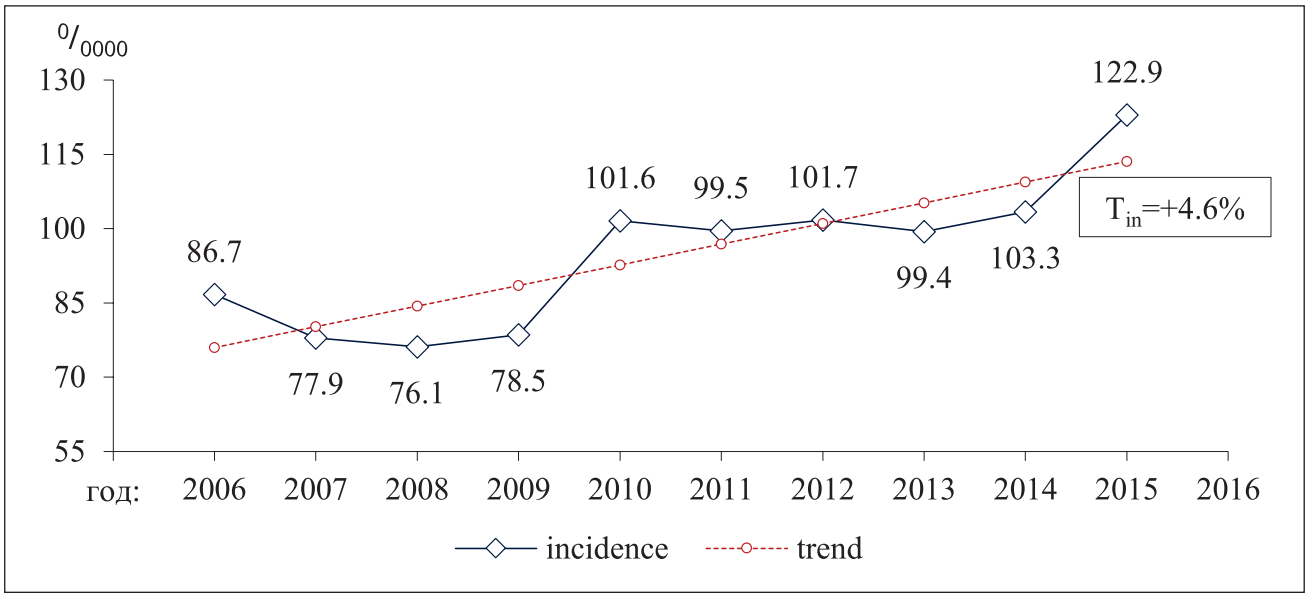

Figure 5 – The dynamics of the incidence rate of gallstone disease among adult population in Kazakhstan for 2006-2015

DISCUSSION

The trends in the incidence rate of gallstones in the various studied groups of the population allow us to estimate and identify the general trend of increase or decrease. In Kazakhstan, over the years studied, the incidence in children under 15 years of age and adolescents (15-17 years old) had a tendency to decrease. At the same time, in developed countries, the incidence rate of gallstone disease in children and adolescents is increasing every year.

For example, in England, the incidence rate of gallstone disease among children increased (from 0.78 in 1997 to 2.7 per 100,000 in 2012) [12], and in Canada from 8.8 (1993) to 13.0 per 100,000 people (2012) [13]. A retrospective study in the United States for the nine-year period, where the ending was 2012, registered raise in the gallstone disease [14] among children.

The decrease in the incidence of gallstone disease among adolescents in Kazakhstan is presumably because of the demographic indicators: the number of adolescents decreased in the studied period. The decrease in the gallstone disease incidence rate among children might be due to a change in the influence of risk factors.

We can assume that the increase in the gallstone disease incidence rate among the adult population is associated with an increase in the population and an improvement in the technical equipment of the clinical diagnostic centers [15].

Some studies analyzed the role of a sedentary lifestyle such as watching TV and using a computer as one of the factors contributing to the occurrence of the disease. For example, one of the studies conducted in Korea found that there was a connection between the formation of gallstones and a sedentary lifestyle among the Korean population. So, it was revealed that a long-term sedentary lifestyle increases the risk of developing gallstone disease [16]. For this reason, it is assumable that a sedentary lifestyle could also impact the increase in the incidence of gallstones disease among Kazakhstani adult population, since the scale and level of urbanization are increasing, especially in cities.

Therefore, the results obtained from this study can be portrayed both positively with respect to the child and adolescent population (improvement of preventive measures and reduction of the impact of risk factors), and with caution (deterioration of registration and insufficiency in prompt consideration of newly identified patients), and here we should bear in mind the “top of the iceberg” metaphor (we usually see only the surface of the problem). The results taken from the adult population reveal that a number of preventive measures should be developed to diminish incidence rates. The target of our future research will be to study this problem further and in-depth considering the influence of socio-demographic, medical-geographical, environmental and other factors

Research transparency

Research did not have a sponsorship. The authors are absolutely responsible for presenting the release script for publication.

Declaration about financial and other relations

All authors took part in elaboration of article conception and writing the script. The release script was approved by all authors. The authors did not get the honorary for the article.

Conflict of interest

The authors declare no conflict of interest.

REFERENCES

1 Vorotyncev AS. Sovremennye predstavleniya o diagnostike i lechenii zhelchnokamennoi bolezni i hronicheskogo kalkuleznogo holecistita = Modern ideas about the diagnosis and treatment of gallstone disease and chronic calculous cholecystitis] *Lechashchiy vrach = Attending doctor.* 2012;2:54-58 (In Russ.).

2 Renner O, Lütjohann D, Richter D, et al. Role of the ABCG8 19H risk allele in cholesterol absorption and gallstone disease. *BMC*

Gastroenterology. 2013;13:30. DOI: 10.1186/1471-230X-13-30, [Indexed for MEDLINE].

3 Il'chenko AA. Sovremenniy vzglyad na problemu biliarnogo sladzha = Modern view on the problem of biliary sludge. *Russkiy meditsinskiy zhurnal = Russian Medical Journal*. 2010;18(28):1707-1713 (In Russ.).

4 Ivashkin VT. Gastroenterologiya. Nacionalnoe rukovodstvo: kratkoe izdanie [Gastroenterology. National guideline: a short edition]. Moscow: GEOTAR-Media; 2015:250 (In Russ.).

5 Ivashkin VT. Klinicheskie rekomendacii. Gastroenterologiya [Clinical guidelines. Gastroenterology]. Moscow:GÈOTAR-Media;2008:68 (In Russ.).

6 Shaffer EA. Gallstone disease: Epidemiology of gallbladder stone disease. Best Pract. Res. *Clin. Gastroenterol.* 2006; 20(6):981-996. DOI: 10.1016/j.bpg.2006.05.004, [Indexed for MEDLINE].

7 Елисеенко А.В., Куделькин Н.А. Желчнокаменная болезнь и факторы риска (клинико-эпидемиологическое исследование). // Рос. журн. гастроэнтерол., гепатол., колопроктол. – 2002. – Т.5, №12. – С. 98.

8 Gupta SK, Shukla VK. Silent gallstones: a therapeutic dilemma. *Tropical Gastroenterology*. 2004;25:65-68. PMID: 15471318, [Indexed for MEDLINE].

9 www.stat.gov.kz – official website of the Statistics Committee of the Ministry of National Economy of the Republic of Kazakhstan.

10 Merkov AM, Polyakov LE. Sanitarnaya statistika [Sanitary statistics]. Leningrad; 1974: 384. (In Russ.).

11 Glanc S. Mediko-biologičeskaja statistika [Biomedical statistics]. Moscow; 1999:460 (In Russ.).

12 Khoo AK, Cartwright R, Berry S, Davenport M. Cholecystectomy in English Children: Evidence of an Epidemic (1997-2012). *Journal of pediatric surgery*. 2014; 49. 284-8. DOI: 10.1016/j.jpedsurg.2013.11.053.

13 Murphy PB, Vogt KN, Winick-Ng J, et al. The increasing incidence of gallbladder disease in children: A 20 year perspective. J Pediatr Surg. 2016;51(5): 748-752. DOI: 10.1016/j.jpedsurg.2016.02.017, [Indexed for MEDLINE].

14 Walker SK, Maki AC, Cannon RM, et al. Etiology and incidence of pediatric gallbladder disease. Surgery. 2013;154(4):927-931; discussion 931-3. DOI: 10.1016/j.surg.2013.04.040, [Indexed for MEDLINE].

15 Farthing M, Roberts SE, Samuel DG, et al. Survey of digestive health across Europe: Final report. Part 1: The burden of gastrointestinal diseases and the organisation and delivery of gastroenterology services across Europe. *United European Gastroenterol J*. 2014;2(6):539-543. DOI: 10.1177 / 2050640614554154, [Indexed for MEDLINE].

16 Ryu S, Chang Y, Kim YS, Kim HJ. Prolonged sitting increases the risk of gallstone disease regardless of physical activity: a cohort study. *Scandinavian J of Gastroenterol*. 2018;53(7):864-869. DOI: 10.1080 / 00365521.2018.1476910, [Indexed for MEDLINE].