

ARTICLE

FORMATION OF PRIORITY DISEASES AMONG URBAN AND RURAL ADOLESCENTS

Emiliya R Valeeva*, Gulgena A. Ismagilova, Alfiya I Ziyatdinova, Farida I Serazetdinova

Kazan Federal University, Institute of Fundamental Medicine and Biology, Kazan, RUSSIA

ABSTRACT

Comparative analysis of probabilistic standardized risks of disease incidence among adolescents in Kazan and in the RT showed that during the period under study from 2004 to 2015 they had significant differences. In 2004, high risk both in Republican indices, and in the city was revealed only in one disease class - the class of pregnancy. In 2015, according to Republican indices, the most significant in formation of diseases were high risks in the following disease classes: Neo, ED, injuries, DD, MSD, and GUD. While in the city of Kazan, there were no diseases, which could be referred to the given category. It should be noted that all indices were in the moderate risk zone, and the prevalence risk revealed the decrease of such classes as CA, NCD, and the class of pregnancy. Among rural adolescents, the studied indices were distributed as follows: the particular focus was on the classes of Blood Diseases and Abnormal Symptoms, Ear Diseases, Circulatory Diseases (CD) - within moderate risk. Important is the fact that there was not any class of diseases, which could be in the range of high risk. Such dynamics remained among the cohort under study in the year of 2010 as well; this fact may be probably associated with carrying out of medical and preventive work and a regular medical check-up of the cohort under study. Beginning from 2012 to 2015 high risk of disease incidence among rural adolescents was determined only in the class of Blood Diseases, and all the rest disease classes were at the moderate risk level.

INTRODUCTION

Adolescents represent a group of young people aged from 10 to 19 years old, which is often considered to be a healthy group in human consciousness. The causes of many serious diseases developing at the age of maturity are laid in adolescence. The Secretary General of the United Nations in September, 2015 declared launching of the Global Strategy, which pursued the global aim "to ensure every woman, every child and adolescent everywhere with possibilities to realize their rights to physical and mental health, social and economic opportunities, as well as full and equal participation in shaping prosperous and sustainable societies" based on nine key areas of activities. Guidance on implementation of global accelerated actions for health of adolescents (AA-HA!) will help the countries and programs in planning, carrying out and monitoring the measures on addressing the needs of adolescents in the field of healthcare in accordance with Global strategy [1-3].

The health of adolescents and youth of the Russian Federation is of utmost importance and priority in solving the tasks of the State policy and is a major element guaranteeing the success of the country development. The official statistical data indicate constant decrease of the adolescent population and the reduction of their proportion among the country's total population [4]. Thus, for the period of 1995–2012, the adolescent population aged 15–17 years old fell by one half. There were 7 391 861 adolescents aged 15–19 years old in Russian Federation in 2012 representing 5.2% of the total number of country residents. Unfavorable trends were observed in disease incidence among adolescents: for the last 10 years (the years 2002–2012) the total morbidity among older adolescents (15–17 years old inclusive) increased by 37.5% – from 161 782.0 to 222 500.9 per 100 000 population of corresponding age [5].

Special studies showed that the real indices of adolescent morbidity exceeded the official ones by a factor of 1.5 – 2. Thus, for the period 1995-2012 the number of Adolescents aged 15-17 years 2 times. In the Russian Federation in 2012, adolescents at the age of 15-19 years was 7 391 861, which was 5.2% of the total number of inhabitants of the country [6]. In the whole, the level of disease incidence of the child population increased by 68.4%, and that of adolescents – by 98.4% for the last 20 years. The level of disease incidence among adolescents was 1.7 times significantly ($p < 0.05$) lower than among children [7].

In Russia, in recent years the first four places were traditionally occupied by the respiratory diseases, injuries, poisoning and certain other consequences of external causes, the diseases of the skin and subcutaneous tissue, and the digestive diseases. The diseases of the genitourinary system instead of infectious diseases rank fifth. The first five places account for 75.8% of all revealed pathology. Conditions and lifestyle have a very significant effect on formation of the adolescent health [7-9]. At present they are characterized by considerable study loads, intensification of the educational process, poor adherence to a healthy lifestyle, and etc. Unfavorable effect of social risk factors on the adolescent health is particularly important. Therefore, a comparative analysis of the differences in probabilistic standardized risks in the formation of certain groups of diseases among rural and urban adolescents for the period from 2004 to 2015. is an important.

KEY WORDS

high risk, moderate risk,
disease classes,
adolescents, city, rural
settlement, morbidity

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*Corresponding Author

Email:
ERValeeva@kpfu.ru

MATERIAL AND METHODS

Methods

Morbidity study was carried out with application of epidemiological approaches [10]. In-depth analysis of the adolescent morbidity was carried out on the basis of annual reports (statistical form No.12) of the medical healthcare institutions in the city of Kazan and in the RT for the period from 2004 to 2015. Absolute values, intensive (per 1000 population) and extensive indices (morbidity patterns) were used to characterize the population health indices. "Methodological foundations for assessment of the population health regional risk due to the effect of unfavorable environmental factors and rationale for integrated management decisions directed towards decrease of their impact" were used to determine differences of probabilistic standardized risks of formation of certain disease groups among adolescents [10].

Comparison of the overall morbidity indices characterizing the examined population cohorts was carried out by means of Student T-test according to the formula:

$$t = \frac{|x_1 - x_2|}{\sqrt{\sigma(\bar{x})_1^2 + \sigma(\bar{x})_2^2}}$$

$$T = x_1 - x_2$$

where, x_1 and x_2 = average values in compared groups
 $\sigma(x)$ = the mean-root square error of the mean value

To determine differences in indices of a newly diagnosed disease Fisher statistics was used:

$$F = \frac{(\varphi_1 - \varphi_2)^2 \cdot (n_1 - n_2)}{n_1 \cdot n_2}$$

φ_i = the value of the proportional morbidity measured in radians
 n_i = the number of observations

Such approach is explained by the fact that recurrences may take place in one and the same person in the sampling observed in overall morbidity. Taking into consideration this peculiarity, the probabilistic characteristic of indices is constructed on the basis of Poisson distribution indicating the application of Student T-test [11].

At the next stage we compared the values of probabilistic standardized (in respect of the city and the Republic) risks of prevalence of 18 disease groups among adolescents based on annual medical examinations in 2004-2015. The values of the first quartile of the series were chosen as the upper limit of acceptable risk. The value of the second quartile (median) served as the index of the upper limit of the moderate risk, and the value of the third quartile – as the increased risk [Table1]. All calculated values of probabilistic risks exceeding the upper limit of the increased risk were referred to appropriate absolute values of high risk diseases.

Table 1: Scale of disease gradations

ICD diseases	1 quartile	2 quartile	3 quartile
NCD	0,393	0,525	0,789
Neo	0,393	0,619	0,817
BD	0,393	0,604	0,712
ED	0,393	0,453	0,501
PD	0,393	0,674	0,525
ND	0,393	0,541	0,634
O&AD	0,393	0,738	0,914
Ear D	0,393	0,738	0,914
CD	0,393	0,688	0,735
RS	0,393	0,426	0,475
DD	0,393	0,679	0,891

RESULTS

Comparative analysis of the disease groups under study in the Republic of Tatarstan and the city of Kazan revealed high risk among diseases in adolescents only in the class of pregnancy and delivery (Preg & Del) in year of 2004 [Fig. 1].

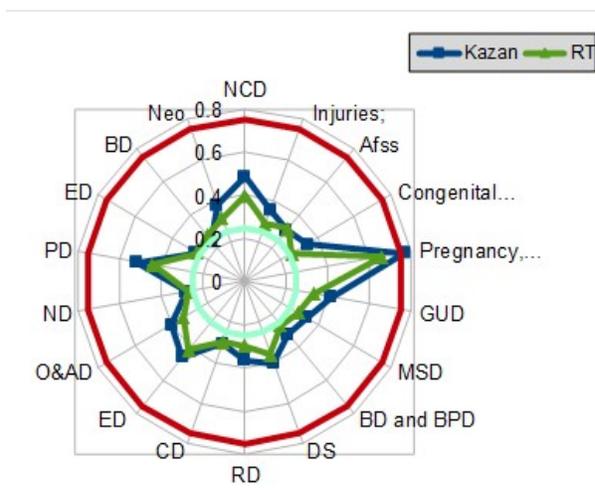


Fig. 1: Probabilistic normalized risks of prevalence of diseases among adolescents Republic of Tatarstan and Kazan in 2004.

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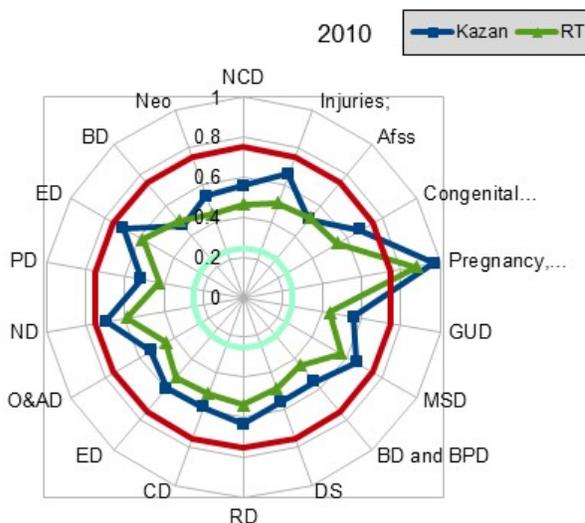


Fig. 2: Probabilistic normalized risks of prevalence of diseases among adolescents Republic of Tatarstan and Kazan in 2010.

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In 2010 a moderate risk was revealed in the following disease classes: the endocrine diseases (ED), injuries, poisoning and certain other consequences of external causes (INJ), neoplasms (Neo), nervous diseases (ND), respiratory diseases (RD), circulatory diseases (CD), digestive diseases (DD), musculoskeletal diseases (MSD), genitourinary diseases (GUD), and congenital anomalies (CA) in the Republic of Tatarstan. High risk both in Republican indices, and in the city was revealed only in one disease class - the class of pregnancy [Fig.2].

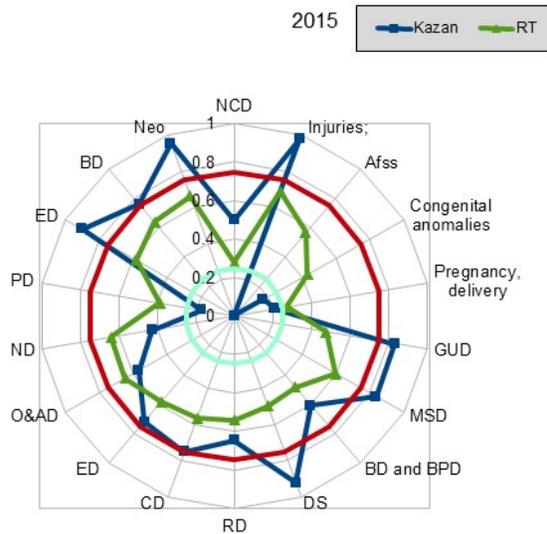


Fig. 3: Probabilistic normalized risks of prevalence of diseases among adolescents Republic of Tatarstan and Kazan in 2015.

In 2015, according to Republican indices, the most significant in formation of diseases were high risks in the following disease classes: Neo, ED, injuries, DD, MSD, and GUD [12]. While in the city of Kazan, there were no diseases, which could be referred to the given category. It should be noted that all indices were in the moderate risk zone, and the prevalence risk revealed the decrease of such classes as CA, NCD, and the class of pregnancy [Fig. 3], being a very good index characterizing the health among the urban adolescents. [fig 4]

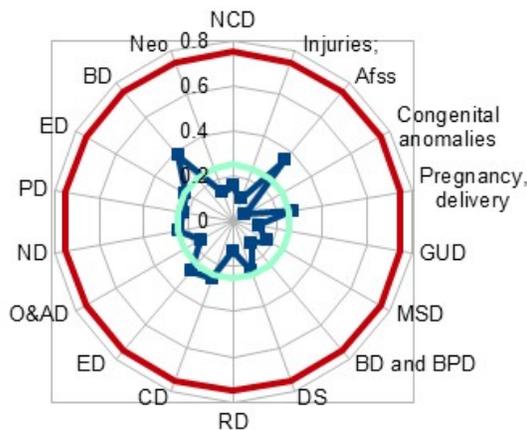


Fig. 4: Probabilistic normalized risks of disease prevalence among rural adolescents in 2004.

Among rural adolescents, the studied indices were distributed as follows: the particular focus was on the classes of blood diseases and abnormal symptoms, ear diseases, circulatory diseases (CD) – within a moderate risk. Important is the fact that there was not any class of diseases, which could be in the range of high risk. Such dynamics remained among the cohort under study in the year of 2010 as well; this fact may be probably associated with carrying out of medical and preventive work and a regular medical check-up of the cohort under study, the work of school physicians and pediatricians [Fig 5].

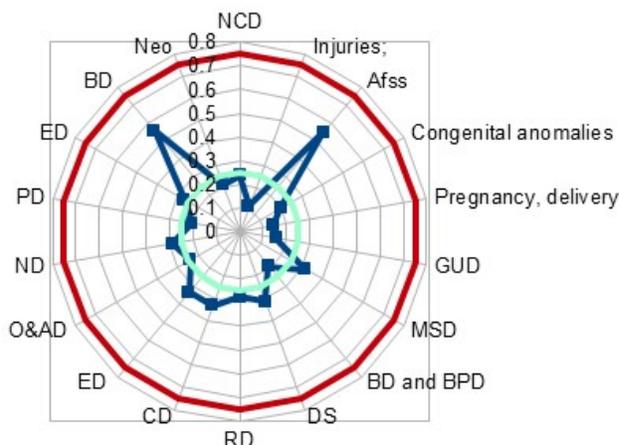


Fig. 5: Probabilistic normalized risks of disease prevalence among rural teenagers in 2010.

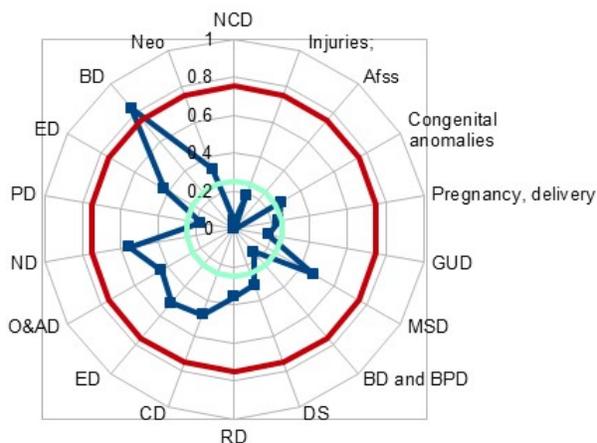


Fig. 6: Probabilistic normalized risks of disease prevalence among rural teenagers in 2015.

Beginning from 2012 to 2015 high risk of disease incidence among rural adolescents was determined only in the class of blood diseases, and all the rest disease classes were at the moderate risk level [Fig. 6].

We can assume that adolescents living in rural areas have less diverse nutrition, and they consume little amount of protein-containing foods unlike the urban adolescents [13,14].

DISCUSSION

For the purpose of getting the work on preservation and strengthening of the students' health going, it is necessary to ensure the restoration of the system of rendering medical aid to children in educational institutions by implementation of measures for reactivation of medical rooms in general educational organizations, their provision with modern medical equipment, as well as social support of doctors and nursing staff working in educational institutions.

It becomes obvious on the basis of the carried out studies that to solve the problems of the adolescent health a systemic approach within the frames of legislation improvement, development and implementation of special federal and regional programs is required.

CONCLUSION

Comparative analysis of adolescent morbidity allowed identifying high risks for the period under study in the Republic of Tatarstan, which progressed during the given ten years. The indices in the city of Kazan were in the moderate risk zone, and the disease prevalence risk revealed the decrease of such classes as CA, NCD, and the class of pregnancy. The results of analysis of the rural adolescent population showed

slight increase of morbidity indices by the year of 2010 in the disease groups, and they were identified as having a moderate risk of their prevalence among adolescents. According to our data, high risk of forming the only disease class – the class of blood diseases was observed in rural adolescents from the cohort under study.

CONFLICT OF INTEREST

There is no conflict of interest.

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None

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