SECTION 20. Medicine.

Sarviniso Islamovna Ibragimova
Master`s Student in Medical Sciences
International Kazakh-Turkish University by name
Yassavi, Kazakhstan
sarvinsa@mail.ru

Kumisai Sabetovna Babayeva
Candidate of medical science, a.e. association professor
Head of the Department of Emergency Medical Care
International Kazakh-Turkish University by name
Yassavi, Kazakhstan
atu1972@mail.ru

Dilfuza Narzullaevna Mamraimova
Master`s student in Medical Sciences
International Kazakh-Turkish University by name
Yassavi, Kazakhstan
mdnkz@mail.ru

Karlygash Zharylkasymovna Sadykova
PhD Student in Medicine Sciences
International Kazakh-Turkish University by name
Yassavi, Kazakhstan
karadias77@mail.ru

Zhanar Sailaubekovna Shalkharova
DM, Vice-president
GI "Educational and Healthcare Holding"
zhanar.shalkharova@gmail.com

Zhanat Nagmetovna Shalkharova
DM, Professor
International Kazakh-Turkish University by name
Yassavi, Kazakhstan
janatsh@mail.ru

CHARACTERISTICS OF ELECTROCARDIOGRAPHIC ABNORMALITIES AMONG RESIDENTS OF TURKESTAN REGION IN POPULATION-BASED STUDY

Abstract: *In this article is presented the prevalence of ECG abnormalities, depending on the gender, nationality and geographical location in Turkestan.*
Key words: *electrocardiogram, major and minor abnormalities.*
Language: *English*
Citation: Ibragimova SI, Babayeva KS, Mamraimova DN, Sadykova KZ, Shalkharova ZS, Shalkharova ZN (2016) CHARACTERISTICS OF ELECTROCARDIOGRAPHIC ABNORMALITIES AMONG RESIDENTS OF TURKESTAN REGION IN POPULATION-BASED STUDY. ISJ Theoretical & Applied Science, 03 (35): 154-158.
Soi: http://s-o-i.org/1.1/TAS-03-35-26   *Doi*: crossref http://dx.doi.org/10.15863/TAS.2016.03.35.26

BACKGROUND: Electrocardiography (ECG) is the most important and initial method in the diagnosis of electrical potentials abnormalities of the myocardium [1]. Nowadays, there are many other visualized and invasive diagnostic methods of cardiac electrophysiology, but in spite of it, ECG remains as more economy, affordable and non-invasive method of investigating the electrical potentials of the heart [2].

In the middle of the last century there was developed Minnesota coding system for improving ECG results standardization, which was significantly improved the process of decoding ECG determinants

and for comparing it with another epidemiological studies in different population and countries [3].

Starting from using the Minnesota coding system, several epidemiological surveys were focused on the assessment of the prevalence of ECG changes. The majority of these surveys investigated ECG changes among men, and only a few of them, among women. In one of these studies showed, that the prevalence of pathological ECG changes is occurs more frequently among males [4], while another scientists informs about the similar frequency rates of occurrence among both genders [5]. However, there were results of other reports that some determinants of the ECG changes occurs more frequently - in females [6].

As well as gender, there are many scientific works, which were aimed for studying the differences of prevalence ECG changes between urban and rural population. Thus, it was shown that ECG abnormalities are more common among city residents, compared with the rural dwellers [7]. Simultaneously, there were studies that showed pathological changes in cardiac electrophysiology also often met among rural dwellers. [8].

ECG changes were also explored depending on ethnicity. For instance, Turkish scientists examined ECG abnormalities, who identified that ECG changes registered more frequently in Turkish origin in comparison with Japanese [9]. Analogous works had been done among the Arab and African origin, and it was revealed that the prevalence of ECG abnormalities of the Arabs was lower (0.3%), than African residents (1.2%) [10]. There were also studied ECG abnormalities within one nationality. And one of these researches was investigated among the Kazakh population living in Hinzhiang (China). Analyze of ECG data showed a high prevalence of abnormalities of the heart electrophysiology among Kazakhs, and changes more frequently found among women compared to men. The most frequent pathology among Kazakh nationality was atrial fibrillation and authors of this work note, that prevalence of atrial fibrillation is much higher than it was declared in a previous studies [11].

AIM: To study the prevalence of ECG changes depending on gender, ethnicity and geographical location of dwellers of Turkestan.

DESIGN, MATERIALS AND METHODS: Design of the study is based on a cross-sectional population-based study conducted in Turkestan region. Out of whole sample (1143 respondents), ECG changes have been studied in 14% (158). The data was obtained using statistical package of programs: MS Excel (2010), Biostat.

Out of all 158 patients, number of men was 48, women 110, respectively. The average rate of age of the studied men and women was 50.1 ± 13.7 and 52.1 ± 13.7 consequently.

Registration of ECG was carried out with the help of special software program in the standard 12-lead ECG. Results of ECG were carried out according to the recommendation of the British Cardiovascular Association [12]. Standardization of ECG abnormalities were coded by the Minnesota coding system, which was recommended by World Health Organization and the American Heart Association [13]. Electrocardiogram abnormalities were divided into major and minor abnormalities according to the Minnesota code.

Major abnormalities:
3-1,4-1-Left ventricular hypertrophy
4-1, 4-2-Major ST-T abnormalities
7-1-Complete left bundle branch block (LBBB)
8-3-Atrial fibrillation (AF)

Minor abnormalities
5-3-Minor ST-T abnormalities
7-3-Incomplete right bundle branch block (RBBB)
7-6-Left posterior fascicular block
7-7-Left anterior fascicular block
8-1-1, 8-1-2, 8-1-3 Extrasystoles
8-7-Sinus tachycardia
9-7-Early repolarization
Sinus arrhythmia

Comparative analysis of the prevalence of ECG abnormalities determined using Pearson's $\chi2$.

RESULTS: Determinants of ECG changes of 158 patients showed in Table 1.

Table 1

Structure of ECG changes according to the Minnesota coding system.

	Minne sota code	ECG abnormalities	n=158
	-	Normal	36,7%
Major abnormalities	3-1 and 4-1	LVH	16,5%
	4-1, 4-2	Major ST-T abnormalities	1,3%
	7-1	Complete LBBB	1,3%
	8-3	AF	0,6%

	5-3	Minor ST-T abnormalities	1,3%
Minor abnormalities	7-3	Incomplete RBBB	8,9%
	7-6	LPFB	0,6%
	7-7	LAFB	25,9%
	8-1-1,8-1-2, 8-1-3	Extrasystoles	1,9%
	9-7	Early repolarization	3,2%
	8-7	Sinus tachycardia	1,3%
	-	Sinus arrhythmia	0,6%
Overall			100%

In 36.7% of patients pathological ECG changes were not registered. Out of major abnormalities the most often pathology was LVH, of minor abnormalities was incomplete bundle branch blocks.

Table 2

The prevalence of ECG abnormalities by gender differences.

	ECG abnormalities	Men		women	
		n	%	n	%
Major abnormalities	LVH	7	14,3%	19	**17,5%**
	Major ST-T abnormalities	1	**2%**	1	0,9%
	Complete LBBB	1	**2%**	1	0,9%
	AF	-	-	1	**0,9%**
Minor abnormalities	Minor ST-T abnormalities	-	-	2	**1,8%**
	Incomplete RBBB	2	4,1%	12	**11%**
	LPFB	-	-	1	**0,9%**
	LAFB	16	**32,7%**	25	23%
	Extrasystoles	-	-	3	**2,7%**
	Early repolarization	3	**6,1%**	2	1,8%
	Sinus tachycardia	1	**2%**	1	0,9%
	Sinus arrhythmia	-	-	1	**0,9%**
Normal		18	36,7%	40	36,7%
Overall		49	100%	109	100%
χ^2=9,835; p=0,043					

Major ECG abnormalities in particular LVH, AF, were more often among women, and was confirmed by a statistically significant p-value. While minor abnormalities, such as LPFB, early repolarization occurred more among men.

Table 3

The prevalence of ECG abnormalities by national differences.

	ECG abnormalities	Kazakh		Uzbek	
		n	%	n	%
Major abnormalities	LVH	16	16,8%	10	16,1%
	Major ST-T abnormalities	2	2,1%	-	-
	Complete LBBB	1	1%	1	1,6%
	AF	-	-	1	1,6%
	Minor ST-T abnormalities	1	1%	1	1,6%
	Incomplete RBBB	8	8,3%	6	9,8%
	LPFB	1	1%	-	-

Minor abnormalities	LAFB	23	23,9%	18	29%
	Extrasystoles	1	1%	2	3,2%
	Early repolarization	2	2,1%	3	4,8%
	Sinus tachycardia	1	1%	1	1,6%
	Sinus arrhythmia	1	1%	-	-
Normal		39	40,7%	19	30,7%
Overall		96	100%	62	100%
$\chi^2=7,753$; p=0,101					

These ECG data did not differ by nationality.

Table 4

Prevalence of ECG abnormalities among urban and rural population.

	ECG abnormalities	Urban		Rural	
		n	%	n	%
Major abnormalities	LVH	18	**18,9%**	8	12,7%
	Major ST-T abnormalities	2	**2,1%**	-	-
	Complete LBBB	1	**11,1%**	1	1,6%
	AF	-	0	1	1,6%
Minor abnormalities	Minor ST-T abnormalities	2	**2,1%**	-	0
	Incomplete RBBB	8	8,4%	6	**9,4%**
	LPFB	-	-	1	**1,6**
	LAFB	22	23,1%	19	**30,2%**
	Extrasystoles	1	1,1%	2	**3,2%**
	Early repolarization	2	2,1%	3	**4,8%**
	Sinus tachycardia	1	1,1%	1	**1,6%**
	Sinus arrhythmia	1	**1,1%**	-	-
Normal		37	38,9%	21	33,3%
Overall		95	100%	63	39,2%
$\chi^2=10,237$; p=0,037					

Studying the prevalence of ECG abnormalities, depending on the place of residence showed that the major abnormalities statistically significantly met more frequently among citizens and the minor abnormalities are more common among rural residents.

DISCUSSIONS. As the result of our study ECG changes the highest prevalence of ECG changes in men. Similar results were obtained by researchers De Bacquer and Assantachai [14,15]. Nevertheless, many works in the literature showed the same prevalence of ECG changes as men so in women [16, 17]. In the contrast to this, some researchers report that ECG abnormalities more often registered in women, compared to men [18, 19].

As it shown in Table - 2, there were no statistically significantly differences in the prevalence of ECG abnormalities amongst Kazakh and Uzbek nationality. Similar results were obtained while comparing the ECG abnormalities of Arab, Indian, Jordanian, Filipino, Caucasian origins where were no significant differences among examining determinants [20]. In addition, there have been a lot of researches with statistically significant changes among different nationalities [21,22].

The results of our study showed that ECG abnormalities are most often encountered in rural region and it is comparable with the study carried out in Tanzania, which revealed a higher incidence of ECG abnormalities in rural residents [23]. While the researchers from Turkey found in their research the same prevalence of ECG abnormalities, as for citizens, so for urban residents [24].

CONCLUSION:

1**.** In the result of our population-based study we revealed that only 36.7% of people had not registered ECG changes.

2. Major ECG abnormalities, in particular LVH, AF were more often among women while minor abnormalities, such as LPFB, early repolarization occurred more among men.

3. Changes in cardiac electrophysiology were not varies by ethnicity.

4. Major ECG abnormalities' determinants were more often among city dwellers, while minor ECG abnormalities were occurred in rural areas.

References:

1. Nikus K, Birnbaum Y, et al. (2014) Updated electrocardiographic classification of acute coronary syndromes. Curr.Cardiol Rev. 2014.
2. Lupanov VP (2013) Sovremennie metody instrumentalnogo issledovaniya bolnyx stabilnoy ishemicheskoy boleznyu cerdca pri dlitelnyx nablyudeniyax. J.RMJ №12, page 601, 2013.
3. Fernández-Armenta J, Berruezo A (2014) How to recognize epicardial origin of ventricular tachycardias? J.Curr.Cardiol Rev. 2014.
4. Rao X, Wu X, et al. (2000) Comparison of electrocardiographic findings between Northern and Southern Chinese population samples. J. Epidemiol. 2000 Feb.
5. De Bacquer D, De Backer G, et al. (1998) Prognostic value of ECG findings for total, cardiovascular disease, and coronary heart disease death in men and women. J.Heart. 1998 Dec.
6. Pshenichnikov I, Shipilova T, et al. (2011) Association between ventricular repolarization and main cardiovascular risk factors. J.Scand.Cardiovasc. 2011 Feb.
7. Gupta R, Gupta VP, Sarna M, et al. (2002) Prevalence of coronary heart disease and risk factors in an urban Indian population: Jaipur Heart Watch-2.J. Indian Heart, 2002.
8. Tandon VR, Mahajan A, et al. (2010) Prevalence of cardiovascular risk factors in postmenopausal women: A rural study. J. Midlife Health, 2010 Jan.
9. Erdem A, Uenishi M, et al. (2012) Cardiac autonomic function in metabolic syndrome: a comparison of ethnic Turkish and Japanese patients. J .Interv. Card.Electrophysiol. 2012 Dec.
10. Riding NR, Salah O (2014) ECG and morphologic adaptations in Arabic athletes: are the European Society of Cardiology's recommendations for the interpretation of the 12-lead ECG appropriate for this ethnicity? J. Sports Med. 2014 Aug.
11. Mu HY, Qiu P, et al. (2010) Electrocardiogram Minnesota codings from 30 000 adult cases with Kazakh ethnicity in Xinjiang, China. J. Zhonghua Liu Xing, Bing Xue Za Zhi. 2010 Apr.
12. (2013) Guidelines for recording a standart 12-lead electrocardiogram. British Cardiovascular Society, February 2013.
13. Prineas R, Crow R, Zhang Zhu-Ming (2010) The Minnesota Code Manual of Electrocardiographic Findings. Standards and Procedures for Measurement and Classification. Second edition, new and enlarged. New York, 2010.
14. De Bacquer D, De Baker G, Kornitzer M (2000) Prevalences of ECG findings in large population based samples of men and women. J. Heart 2000.
15. Assantachai P, Panchavinnin P, Pisalsarakij D (2002) An Electrocardiographic survey of elderly Thai people in the rural community. J Med Assoc. Thai. 2002.
16. Morise AP, Diamond GA (1995) Comparison of the sensitivity and specificity of exercise electrocardiography in biased and unbiased populations of men and women. Am Heart J. 1995.
17. Gogolashvili NG, Novgorodtseva NI, et al. (2004) Incidence of heart rate disorders in rural population of Krasnoiarsk region. Ter. Ark. 2004.
18. Kim YM, Kim MK (2006) The resting electrocardiographic ST segment depression and related factors at a rural adult community, Korea. J. Prev. Med. Public Health. 2006 Nov.
19. Jafar TH, Qadri Z, Chaturvedi N (2008) Coronary artery disease epidemic in Pakistan: more electrocardiographic evidence of ischaemia in women than in men. J. Heart. 2008 Apr.
20. Mansi IA, Nash IS (2001) Ethnic differences in electrocardiographic intervals and axes. J Electrocardiol. 2001 Oct.
21. Bonny A, et al. (2013) Ethnic differences in electrocardiogram between a black African and a white European young adult population under 35 years. J. Presse Med. 2013 Apr.
22. Prakash M, Partington S, et al. (2003) The effect of ethnicity on survival in male veterans referred for electrocardiography and treadmill testing. J. Arch Intern Med. 2003 Oct 13.
23. Onat A, Ugur M, et al. (2010) The Turkish Adult Risk Factor survey 2009: similar cardiovascular mortality in rural and urban areas. Turk Kardiyol Dern. Ars. 2010 Apr.
24. Walker RW, Dewhurst M, et al. (2014) Electrocardiographic assessment of coronary artery disease and stroke risk factors in rural and urban Tanzania: a case-control study. J Stroke Cerebrovasc. Dis. 2014 Feb.